The Farm

QUARTERLY AUTUMN 1951 FIFTY CENTS

REVOLUTION IN COTTON

HOW TO GO TO GRASS

The Farms of Spain

ALL GRAND CHAMPIONS ALL *Calf Manna* FED

BREEDING determines how good an animal **can** be, but...

FEEDING largely determines how good that animal **will** be!

With beef cattle, dairy cattle, horses, hogs, sheep, goats, chickens, turkeys, and rabbits, more major-show Grand Champions and World Champions have been raised and fitted with Calf Manna, during the past 16 years, than any other commercial product. Surely such an imposing record deserves your investigation.

Try Calf Manna now.

"MEADOW GOLD" . . . Grand Champion steer over all breeds in the 1951 Southwestern Exposition and Fat Stock Show, Fort Worth, and the Champion Angus steer and Reserve Grand Champion over all breeds at the 1951 National Western Stock Show, Denver. Owned, shown and Calf Manna-fed by C. E. Yoder and Sons, Muscatine, Iowa.

Send today for your free copy of the colorful, illustrated folder, "Raising Better Livestock With Calf Manna".

Address office nearest you:

Albers Milling Co.

Dept. 989
Stuart Building
Seattle, Washington

or

Dept. 989
Fairfax Building
Kansas City, Missouri

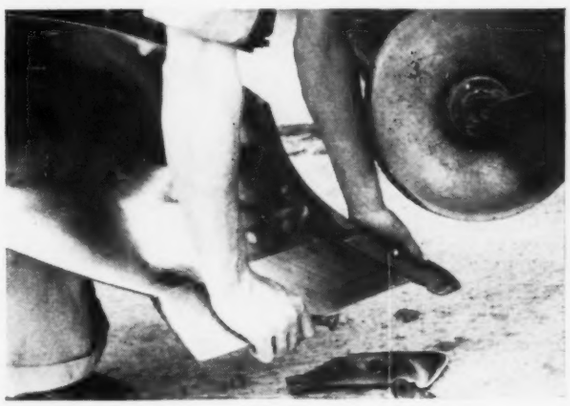
For the Neatest Furrows You've Ever Turned . . .

1 McCormick FARMALL Super C with 12% More Pull Power

Take the wheel of the 2-row, 2-plow Farmall Super C on your toughest plowing job. See how easily it handles, how smoothly the double-disc brakes and firm, positive clutch respond. Listen to the smooth hum of the engine . . . new 4-ring power seal on pistons provides quicker seating, longer lasting gas seal, better compression. Feel the high-traction pull from proper power-to-weight balance.

2 Quick-Connect McCormick PLOW for Center-Draft Plowing

The 2-furrow, 14-inch bottoms of the quick-connect No. C-295A plow turn clean, even furrows at all tractor speeds. Plow is easy to attach, easy to level. New, simplified hitch is centered; there is minimum side-draft; the plow runs smoothly, pulls evenly. It's light-draft, for low-cost operation. Hydraulic Touch-Control raises, lowers, regulates plowing depth *accurately*.



3 PLOW CHIEF Bottoms— You Save Half on Shares

Watch the Plow Chief bottoms, with Spearhead points, on the No. C-295A plow go down fast, *and stay down.* After a couple of rounds, notice the mirror-clean shine on the moldboards. See how *completely* you cover trash. Spearhead points are economical—cost no more than sharpening a regular share. Save sharpening, save money. Points are easy to change, come in convenient cartons—six Spearhead points to a package.

4 Pull Power for ALL Drawbar Work

On *all* your drawbar jobs, SEE and FEEL the pull power of the Farmall Super C. Feel the ground-gripping traction of the big 54-inch-high tires. Make sharp turns fast at headlands; watch the swinging drawbar bring pull-behind machines around with no binding or tugging. With all this, you also get amazing fuel economy. Ask your IH dealer for the full story about the Super C's full line of 25 McCormick work-matched implements.

Ask your International Harvester dealer for a FREE Farmall Super C demonstration!

INTERNATIONAL HARVESTER

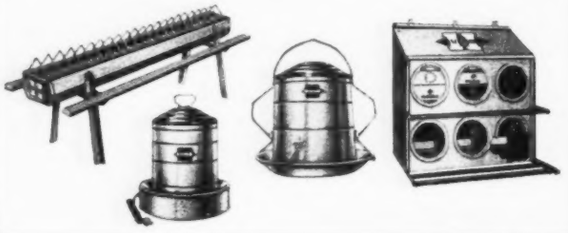
International Harvester Products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—General Office, Chicago 1, Illinois

THIS FALL LET HUDSON HELP YOU

Get More Production with Fewer Hours

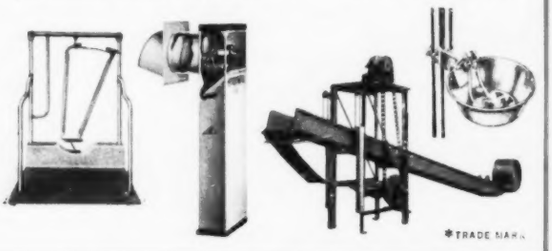
Raising Poultry

Encourage heavy feeding, cut feed waste at the same time with Hudson Feeders. Easy to clean and keep clean. 3 types for all sizes of birds ◆ Keep poultry healthier with cleaner, fresher water in Hudson Fountains, heated or unheated. Or use Automatic Trough Waterers that save both time and labor ◆ Get top price with cleaner eggs—install Hudson all-metal, long lasting, ventilated nests.



Producing Milk

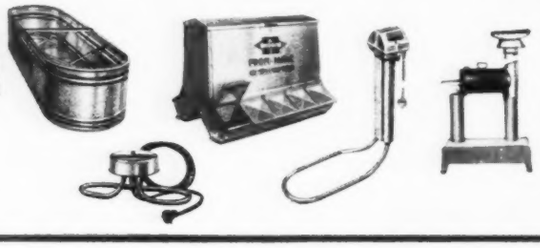
Save up to $2.50 per stall on installation cost with Hudson Steel Stalls. Stanchion stalls, tie stalls, milking stalls ◆ Get up to 20% milk gains with Hudson Sanitary Water Bowls ◆ Improve herd health, protect barn from rot and rust with Hudson Lektrik-Air* Ventilation ◆ Clean barn in minutes with Hudson Hercules Kleen-Ezy* Chainless Barn Cleaner. For smaller barns, Hudson Litter Carrier saves hours a week.



*TRADE MARK

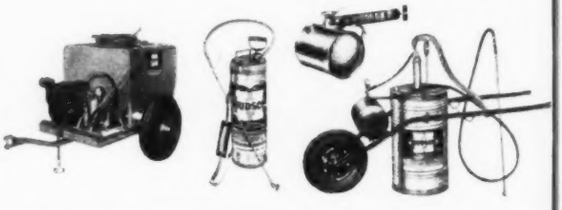
Raising Livestock

Cut hog feeding and watering time in half with Hudson Automatic Hog Feeders and Waterers; get 20% faster gains on 25% less feed ◆ No cracks or seams to harbor germs or bacteria in Hudson Sanitary Steel Stock Tanks . . . full size, built to last ◆ Get more milk, more meat, with less feed with Hudson Tank Heaters. Electric, oil and solid fuel types.



Fall Spraying

Destroy many types of perennial weeds with Fall spraying in stubble fields, pastures, fence rows, ditches, road sides . . . eliminate brush . . . with Hudson Sprayers ◆ Control pests and disease on poultry, hogs, cows, beef cattle . . . increase production by using Hudson Sprayers and Dusters all through Fall and Winter. Types for every farm spraying job.



©1951 H.D.H. MFG

THIS YEAR, as never before, America depends on you to: (1) increase meat production (2) save feed grains (3) do both with less labor ◆ Your Hudson dealer will show you Hudson Equipment especially designed to get more production with fewer hours of work . . . to produce **more** pounds of meat and milk with **fewer** pounds of feed. You'll get years of low-cost service with Hudson Tested and Proved Farm Equipment. 46 years of integrity stand behind it. See your Hudson dealer now.

H. D. HUDSON MANUFACTURING COMPANY, 589 E. Illinois St., Chicago 11, Illinois

SIGN OF THE BEST BUY

HUDSON

Tested and Proved
EQUIPMENT

More help from Hudson—to increase production with fewer hours!

Tested and Proved POULTRY EQUIPMENT • BARN EQUIPMENT • LIVESTOCK EQUIPMENT • HAY TOOLS • FARM VENTILATION • SPRAYERS AND DUST

OPEN CENTERS
For This Farmer
Everett Lewison
Vermillion, South Dakota . . .

"On my 360-acre farm I spend a lot of time on my tractors, and I know just about what I have to have in tires to get my work done. Maybe my soil is different, but it seems to me that Firestone Open-Center Tires pull better than any of the others."
EVERETT LEWISON.

TRACTION CENTERS
For His Neighbor
Leaf Larson
Vermillion, South Dakota

"With 550 acres to farm, I have plenty of opportunities to judge tractor tires. About six years ago I had my first experience with Firestone Traction-Center Tires, and today I have them on all my tractors. In my judgment, they're the best tires money can buy."
LEAF LARSON.

Firestone CHAMPIONS FOR BOTH

THAT's the way it is in most farming localities — Some farmers want Open-Center Tires, while others find that Traction-Centers do a better job in their soil conditions. In all probability, you have a definite preference, too.

If it's an Open-Center you like best, try the Firestone Champion Open-Center Tire. You'll find that its curved bars pull better, its Flared Tread Openings keep the tire clean, and its wide, flat tread wears longer than treads of other Open-Center Tires.

Or — if you think a Traction-Center Tire will do your job best, try the one and only Firestone Traction-Center, the choice of more than a million farmers. Remember — only Firestone gives you your choice between the greatest Open-Center and the only Traction-Center Tire on the market today.

Enjoy the Voice of Firestone on radio or television every Monday evening over NBC

Copyright, 1951, The Firestone Tire & Rubber Co.

ALWAYS BUY TIRES BUILT BY FIRESTONE, ORIGINATOR OF THE FIRST PRACTICAL PNEUMATIC TRACTOR TIRE

MODEL "M" Tractor Teams Up with MODEL "A" on the Fahrenkrog Farm for Fast, Low-Cost Operation

CULTIVATING time . . . haying season . . . any time around the calendar a peak load can deliver a 1-2 knockout punch if you're not prepared. But rush seasons hold no worries for Bill Fahrenkrog, R.R. 3, Davenport, Iowa, since he bought a John Deere Model "M" to help out his larger John Deere Model "A" General-Purpose. Mr. Fahrenkrog says:

"We have had our Model "M" about four years and find it to be very easy to handle, very economical, and remarkably powerful for its size. My helper, Hugo Struck, and I consider it to be the best all-around tractor in the light tractor field. We have about 150 acres on our place, 120 of which are under cultivation each season. We use the "M" as a helper tractor for our Model "A" which has not had a wrench put on it for repairs in the 11 years we have had it. You can see why we wouldn't own anything but a John Deere."

If you need a "helper" tractor on your farm, or a light tractor to handle all your work, ask your John Deere dealer for a free demonstration of the Model "M", the 1-2 Plow Standard-Tread General-Purpose, or the "MT" 1-2 Plow Tricycle-Type General-Purpose. Write for free literature on any of the tractors shown, including hydraulically-controlled working equipment.

JOHN DEERE
MOLINE ILLINOIS

The "MT" is the 1-2-Plow John Deere General-Purpose Tractor that plants and cultivates two or more rows at a time. It is shown here with the John Deere No. 101 Corn Picker.

The "MC" is the track-type John Deere 2-3-plow tractor for the special jobs, where extra traction, flotation, stability are needed. Shown here with hydraulic bulldozer.

A COMPLETE SYSTEM OF FARMING FOR SMALLER FARMS...IDEAL HELPER ON LARGE FARMS

COMING IN WINTER

Why are American farmhouses poor imitations of city mansions? Why have architects failed to design a home with beauty, convenience, and comfort for American farms? In the Winter issue *The Farm* will answer these questions, and in collaboration with architects, farm engineers, farmers and their wives will suggest a new type farm home for the consideration of future builders. For a detailed discussion of this project turn to page 82 of this issue.

The veal calf is too often considered a by-product by dairymen who fail to make all they could on calves. There are a lot of fine points in raising a healthy veal and they'll be discussed one by one in the Winter issue.

A *Farm* writer has brought together much country wisdom in a warm, human portrait of a passing type of merchandising, the huckster wagon.

Elephants like peanuts, but so do a large number of Southern farmers, and for good reason. We think you'll want to read "A Day In The Life Of A Peanut."

If you have a poorly drained corn field that would serve better for raising ducks you'll want to hear about the unique mole drainage machine which can drain clay soils without laying tile. Then if you decide on ducks after all, you can turn to the article on these fowl and learn about a new and profitable way to raise them.

There will be an interesting story on an edible cactus—the prickly pear, whose fruit is harvested and shipped to city markets. Another fruit story gives the latest developments in an age-old practice of training fruit trees to grow flat against stone walls. There will be a story about one of the most unusual hogs in the world, the Mule-foot, a strange animal that is all hog but the feet.

If the tongue of the corn picker snaps off, don't cuss—just weld it. And if you don't know how to weld it you can find out in the coming article on the fine points of welding, both electric and gas, from the farmer's standpoint.

There will be an article, "Little Farm—Big Living," on how one 37-acre farm provided a good living for a large family. A New Englander who breeds some of the finest dairy cattle in the country by some of the longest inbreeding practices you've ever heard of will tell about his herd. Then there is the story of how a Kentucky farmer, with a fine recipe for country hams, turned his knowledge into a profitable sideline.

What has the spread of grass farming done to the old rotation idea? You'll find the answers in the winter issue. There will also be the answers to your questions about building and maintaining farm ponds. Still another story tells of a new labor-saving idea in feeding urea to rangeland cattle. This is a big order, but it's Coming In Winter.

THE FARM QUARTERLY

22 East 12th St., Cincinnati 10, Ohio

R. J. McGinnis.....Editor
Fred Knoop.....Executive Editor
Grant Cannon.....Managing Editor
George Laycock.....Associate Editor
Noel Martin.....Layout
Edna O'Connell.....Editorial Secretary
Aron M. Mathieu.....Business Manager

Grain from a mountain farm of Laon, Spain, goes by bullock cart to market.

Contents

THE FARM QUARTERLY

Autumn 1951, Volume 6, Number 3

STOCK PAGE

Should I Raise Broilers?.....32
How To Win A Blue Ribbon.....36
Cows and Oranges.....42
Calf To Cow To Calf.....66
Milk Fever.....78

SOIL AND CULTIVATION

Hydroponics.....30
Conservation District.....44
Trace Minerals And The Farmer.....56

CROPS

Green Grass Of Greenbrier.....50
Hard Facts About Going To Grass.....54
Plain People Grow Big Tobacco.....60
Revolution In The Cotton Fields.....72
Hessian Fly.....48

FEATURES

The Farms Of Spain.....22
Linda.....40
Fighting Bulls.....62
Barn Art.....70
Farm House, U. S. A.....82

DEPARTMENTS

Letters.....8
Farm Books.....10
The Dairy Barn.....14
The Farm's Pictures.....16
Poultry Yard.....12

Contributing Editors: Myron S. Hazen, G. N. Hoffer, Charles Krutch, C. M. Long, George D. Scarseth, Katherine A. Smith

Farm Quarterly. Vol. Six. No. Three. Publication, Editorial and Executive Offices 22 East 12th St., Cincinnati, Ohio. Published quarterly by the Automobile Digest Publishing Corp. Copyright 1951. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the U. S. and Canada. Send check or money order with subscription to 22 East 12th St., Cincinnati, Ohio. Entered as second class matter at the Post Office at Cincinnati, Ohio, under the Act of March 3, 1879. Additional second class permit entered at the Post Office, Greenwich, Conn. (Title Reg. U.S. Pat. Off.) Winter issue on sale Dec. 6.

MORE FARMERS PLANTED MORE PIONEER THIS YEAR

than ever before...

1950 was a tough year for corn in many parts of the corn belt. The season was cold in some sections. Other areas lacked moisture. Freezes came early in the Northern Corn Belt. Farmers found out what hybrids came through with the best corn crops. As a result, this year more farmers, all over the Corn Belt, planted more Pioneer than ever before. Yes, you can depend on Pioneer—in good years or poor. You can depend on it to germinate in cold, wet soil. You can depend on it to withstand hardships during the growing season. And you can depend on it to produce the biggest corn crop that Mother Nature and good farming allow. That's why more farmers planted more Pioneer corn this year than ever before.

PIONEER HYBRIDS BRED IN SIX CORN BELT LOCATIONS

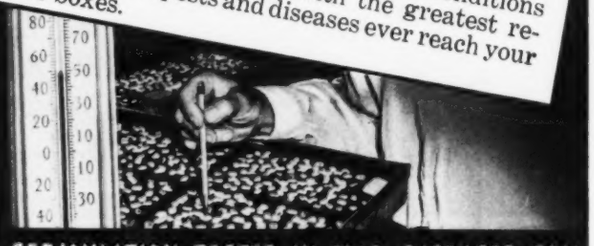
Pioneer hybrids are bred and tested under a wide variety of weather and soil conditions. Pioneer corn breeders develop their inbred lines and hybrids at six Pioneer breeding stations, located in Illinois, Indiana, Iowa, Minnesota and Ohio. Here the breeders constantly develop new and better hybrids—constantly test and retest them under Corn Belt-wide conditions. That's one of the reasons why more farmers planted more Pioneer this year than ever before.

HELL'S ACRES

DESCRIPTION OF WHERE ONLY THE BEST CORN SURVIVES

Imagine corn research plots where the breeders create conditions as unfavorable to corn growing as possible. Where they violate all the rules for good corn production. Where they keep the same soil in corn year after year. Where they purposely increase the root worm and corn borer population each year and plow under additional diseased stocks and ears.

That's exactly what Pioneer corn breeders do in special plots at two of their breeding stations. In these concentration camps for corn—nicknamed Hell's Acres—they seek to develop inbred lines that resist the worst possible conditions. Small wonder then that you can depend on Pioneer corn to make a good crop, even under tough conditions —for only Pioneer hybrids with the greatest resistance to insect pests and diseases ever reach your planter boxes.



GERMINATION TESTED IN COLD, DISEASED SOIL

At the flick of a switch, Pioneer corn breeders create germination conditions more damaging than a cold, wet spring. That's the way they test the germinating vigor of the Pioneer hybrids you plant. They test the seed on trays of cold, wet, diseased soil and keep it in 48 degree temperature for 7 days. This allows plenty of time for seed killing organisms to attack. Then they move the seed to warm germinators. After 4 days, they count the sprouts to determine the germination per cent. You get only high germinating seed corn . . . another reason you can depend on Pioneer.

PIONEER SURE YIELDS

LOOK AT THESE BESTS IN OFFICIAL TESTS

IOWA—Pioneer hybrids made the highest yield in every section of the Official 1950 Iowa Corn Yield Test. C. Martin Myers, of Grundy County, Iowa's 1950 Corn King, planted Pioneer corn which yielded 155.7 bushels per acre.

KENTUCKY — Donald Stout holds highest two-year average yield for Official Kentucky Corn Derby. His two-year average with Pioneer — 153.7 bushels per acre.

MICHIGAN—Two Pioneer hybrids are the only ones ever tested in the Michigan State Yield Trials to carry an average for three consecutive years of over one hundred bushels per acre.

NEW JERSEY—Pioneer corn produced the highest yield in the Official 1950 New Jersey Tests—114.4 bushels per acre.

PENNSYLVANIA—Pioneer corn won the Pennsylvania Five Acre Yield Contest for the second consecutive year. Willard S. Schwager, Lansdale, won in 1950 with a yield of 137.4 bushels per acre. W. H. Oaks and sons, Greencastle, won in 1949 with a yield of 153.6 bushels per acre.

PIONEER HYBRIDS ARE PICKER TESTED

Pioneer corn breeders don't leave picking quality to chance. Developing hybrids that pick easy and clean is part of their research for better and better corn. Every year they plant special corn picker test plots in various parts of the Corn Belt. Yes, they breed and test for stalks that reduce clogging in the picker . . . corn that picks clean . . . ears that resist shelling when picked and seldom shake off when pickers hit the stalks . . . hybrids that give you picking pleasure.

YOU CAN DEPEND ON PIONEER

PIONEER

Pioneer Hi-Bred Corn Company, Des Moines, Iowa
Garst & Thomas Hybrid Corn Co., Coon Rapids, Iowa
Pioneer Hi-Bred Corn Company, Princeton, Illinois
Pioneer Corn Company, Tipton, Indiana

Too bad milk cows aren't mechanical

Wouldn't it be nice if you could just wind up milk cows and have them produce nothing but high quality milk — and lots of it! Pleasant thought, but unfortunately it doesn't work that way.

To get the kind of milk production that makes real profits, cows must be fed properly. And it's not the *quantity* of feed either, but the quality that counts! Successful dairymen have proved to their complete satisfaction that adding Seagram Dried Grains to the feeds they use is the surest, most economical way to increase the quantity and quality of their milk production. The remarkably high percentage T. D. N. (85% Total Digestible Nutrients) in Seagram Dried Grains greatly enhances the nutritional value of ordinary feeds by supplying the important B-vitamins, minerals, fats, proteins and other plus lactation factors.

Write for free copy of Feed Supplements and Proved Formulas which tells how Seagram Dried Grains can be used to increase the size of *your* milk checks.

Better your Profits by Bettering your Feed

JOSEPH E. SEAGRAM & SONS, INC.
Grain Products Division
BOX 240, LOUISVILLE 1, KENTUCKY

Seagram SERVICE TO AGRICULTURE

PERFECT CIRCLE'S

2 in 1 Chrome Piston Ring Set

Alternate HiPressure spring packed with each Chrome Oil Stopper for positive oil control even in badly worn engines.

Double the Life of Cylinders, Pistons and Rings

HERE'S WHY Perfect Circle's new 2-in-1 Chrome Set is making economy news! It's actually *two sets in one* . . .

First, because two expander springs, NORMAL and HiPRESSURE, are packed with every Chrome Oil Stopper . . . giving a choice of pressures to assure positive oil control, regardless of cylinder condition.

Second, because solid chrome plating on BOTH top compression and oil rings assures more than *twice the life* of ordinary sets!

Whether cylinders are slightly or badly worn . . . tapered or straight . . . round or out-of-round . . . the 2-in-1 Chrome Set gives positive oil control in every type of service.

If you do your own engine overhaul work, put in Perfect Circle's 2-in-1 Chrome Set for new power, new economy, new dependability. Or instruct your Doctor of Motors—your favorite mechanic—to install it in your car, truck or tractor. He'll respect your judgment! Perfect Circle Corporation, Hagerstown, Ind.

Perfect Circle

The Most Honored Name in Piston Rings

LETTERS

They Discovered Kudzu

Dear Sir:

A friend has just handed me a copy of Vol. 5, No. 1, of the FARM QUARTERLY, calling my attention to my friend Channing Cope's story of *Kudzu,* in which he gives me credit for the discovery and pioneering of the plant. At this late date, allow me to say that, with the exception of the fact that my wife really made the discovery of the plant as a forage and soil-builder and the two of us developed and gave it to the world in 1903-1908, Mr. Cope's statements are eminently correct.

Although many other good forage and cover crops have been brought out since, I maintain that, as yet, none can come up to Kudzu for its real value to America. Its ability to stop and hold erosion gives it more potential value than any other plant. Our soil is our most vital and valuable asset.

C. E. Pleas.

Chipley, Florida.

Corn Cobs Stop Water

Dear Sir:

The purpose of this letter is to bring to your attention a method of Flash Flood Control that appears to be quite unknown and is surprisingly effective.

For years we have burned mountains of corn cobs and wondered what they were good for. Quite by accident we dumped a load of cobs in a wash; they happened to be about the center of the wash. The flood water ran around at each end and flattened out the wash, and the cobs, fully saturated with captured top soil, became a valuable asset to the land.

Each cob dam divides the volume and force by one half. The cobs become a water filter which captures a very great part of the top soil that is running down the wash in buttermilk solution. By stopping the force of the running water its cutting ability is destroyed.

How soon the farm tools can be drawn over the shrunken dam, which has become a mound of topsoil, depends on the height and size of the dam, generally from one to three years.

On my 750-acre farm near Kentland, I have at this time twelve of these dams in operation. Dams are from 35 to 75 feet in length, using 43 truckloads of cobs. At the end of each dam a sack or sacks of dirt is used to balance the water running around the ends of the dam.

Neal Tanquary.

Kentland, Indiana.

Buggies and Draft Horses

Dear Sir:

Not in many months have I so enjoyed an article as your "Last Buggy Factory" (The Farm, Summer 1951).

But what detracted enormously was the almost complete lack of illustrations of varied buggies. Looks like somebody in your organization was "asleep at the switch."

Now, how about a write-up, with photographs, on such good old breeds of draft horses as Belgians, Clydesdales, and Shires?

Herbert E. Webster.

Chicago, Ill.

The Brand in Demand

Join the big swing . . . join the thousands of farmers swinging to Wayne . . . the brand giving *more meat, milk and eggs* with *less feed, time and work* than ever before . . . to *more farmers* than ever before. You too can enjoy the amazing results of Wayne Tail Curler and other Wayne Feeds . . . thanks to famous Wayne *I.Q.* and new Wayne *I.B.*, which assure all ingredients and necessary nutrient factors (Antibiotics, Vitamin B_{12} or APF, and other high-potency ingredients) *in proper proportion for top performance and feeding efficiency*.

No other brand can offer you this "feed power" combination of Wayne I.Q. and Wayne I.B.

NOW IS THE TIME TO GET THESE WAYNE BENEFITS!

- *For EXTRA EGGS*, steady laying, low feed cost per dozen, use Wayne Egg Mash . . . all-mash or concentrates . . . in Krums, Pellets or Meal form.
- *For BIGGER PORK PROFITS* condition sows on Wayne Brood Sow Supplement or Pig & Sow Meal. For husky, vigorous weanling pigs, creep-feed amazing Wayne Tail Curler . . . the feed that helps MAKE HOGS OUT OF RUNTS. Speed porkers to market on Wayne Hog Balancer or Supplement.
- *For MORE MILK MONEY* . . . save milk; build strong, growthy calves with Wayne Calf Starter. Boost milk production with the Wayne Dairy Feed that supplements your own grain and roughage.

See your friendly Wayne Dealer TODAY!

ALLIED MILLS, INC., Builders of TOMORROW'S Feeds . . . TODAY!

Executive Offices: Chicago 4, Ill. Service Offices: Ft. Wayne 1, Indiana

Which is really Betty Grable?

Batteries also look alike but AUTO-LITE STA-FUL NEEDS WATER ONLY 3 TIMES A YEAR!

No matter how much batteries look alike, you'll have the answer to your battery problems when you install Auto-Lite "Sta-ful," the battery that needs water only 3 times a year in normal car use. In addition, Auto-Lite "Sta-ful" Batteries give longer life in tests conducted according to accepted life cycle standards.

And you'll have the right answer when you select the girl at left as Betty Grable, star of the 20th Century-Fox production "Meet Me After The Show." At right is Lorene McKendrick of San Leandro, California.

Remember, car batteries may look alike, but be wise—buy an Auto-Lite "Sta-ful."

IN NORMAL CAR USE

AUTO-LITE BATTERY CORPORATION
Toledo 1, Ohio

Phone Western Union

. . . ask for "Operator 25" . . . she'll give you the name of your nearby Auto-Lite Battery Dealer. There is no charge for this service.

AUTO-LITE sta-ful

Tune in "Suspense!" . . . CBS Radio Mondays . . . CBS Television Tuesdays

FARM BOOKS

Servicing and Maintaining Farm Tractors, *by Elmer J. Johnson and Alvin H. Hollenberg. The McGraw-Hill Co., $4.00*

An old tractor man like Push Potty, an Ohio farmer, who has babied one tractor along for some quarter of a century, making all of the repairs himself and even making parts for the old girl when they were needed, might not feel the need for this book since Push operates what amounts to a personally-made tractor. The average farmer who drives a standard machine will find this a helpful reference book. One chapter of the book takes up the problem of locating tractor troubles and making minor repairs, but most of the well-illustrated 312 pages are devoted to discussing the proper use of the machine in order to avoid such troubles. Two of the remaining 14 chapters are devoted to safe useage of tractors and the economical application of power. The other 12 chapters take up in detail the essential maintenance jobs such as lubrication, servicing the transmission, caring for tires, adjusting the carburetion and fuel systems, preparing the tractor for winter, etc. A welcome addition is an appendix with definitions of such lesser known mechanical terms as castellation, grommet, grousers, and splined shaft.

Making the Most of Your Food Freezer, *by Marie Armstrong Essipoff. Rinehart & Co., New York, $3.00*

This book has all the variety and surprise of a Hungarian goulash. The title would indicate that it is about home freezers and much of it *is* about freezers and preparing food for them, but Mrs. Essipoff doesn't stop there. She interlards her excellent advice on freezing techniques with recipes on how to cook whale, an essay on Pilgrim Geese, advice on raising milk goats, and a critical study of all known methods of peeling onions without causing the eyes to water (her conclusion: there is no sure way, and besides, it is good for the eyes).

The sections on freezers and freezing discuss the type and size freezer to buy, containers to use and how to use them, equipment that will lighten the work, buying foods for freezing, and the preparation of food—everything from octopus to egg plant—for the freezer. Whether she is writing about freezing or gardening, Mrs. Essipoff is decidedly partisan. Her book is filled with such statements as: "NO! Goats do *not* smell simply awful." or "If you think that cold sweet stuff you have been making in the ice tray of your refrigerator is ice cream, we part company here and now." or, when giving a recipe, "The Imam fainted with delight when he tasted of This." Though the book sometimes reads like a crusader's tract, it is never dull, sometimes quite amusing, and almost always informative.

HERE IT IS...with far more power

...the new FERGUSON "30"

YEARS AHEAD IN ENGINEERING

with a great new valve-in-head engine
You get 20% more engine power . . . a tremendous increase in lugging power . . . valve rotators . . . and other refinements.

with semi-spherical combustion chambers
You get improved ignition, more complete combustion, less carbon formation, superior performance with a wide range of fuels.

with an amazing new air-fuel system
You get a cleaner, cooler air-fuel mixture that prolongs engine life.

with the one and only Ferguson System
A greatly improved hydraulic system makes it better than ever.

Heavy-duty wheel equipment available at extra cost.

Look at it. Get that feeling of size and power . . . weight and traction. Then consider this fact . . .

. . . here is a tractor that has been built in perfect balance to meet more of your needs, more of the time, than any other tractor.

It has abundant power . . . all you need for most three-bottom plowing. It has flexibility and compactness for doing many jobs quickly, at low cost. It has the one and only Ferguson System.

And it has the greatest torque (*lugging*) characteristic of *any* tractor ever built. Peak lugging power is developed at low engine speeds to keep you moving when heavy going slows you down.

Scores of new features have been engineered into the new Ferguson "30" to make it surpass even the outstanding performance of earlier Ferguson System Tractors. Once you understand what this tractor will do, you'll agree it's the greatest value in tractors ever offered.

SEE YOUR FERGUSON DEALER TODAY

Your Ferguson Dealer has the new "30" on display right now. He'll gladly bring one to your farm for a demonstration on your land and under the work conditions a tractor must meet when you buy it.

Building a better world through better farm mechanization is the business of HARRY FERGUSON, INC., 3639 East Milwaukee Avenue, Detroit 11, Michigan

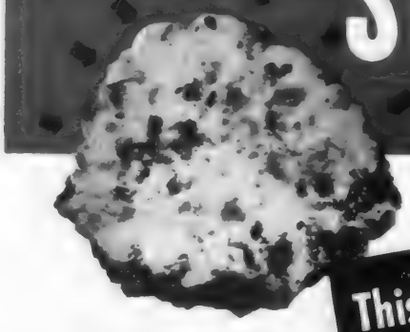
Copyright 1961 by Harry Ferguson, Inc.

FERGUSON TRACTOR

AND 63 FERGUSON SYSTEM IMPLEMENTS

Make good use of good feed with HARD, INSOLUBLE GRIT!

Insist on STONEMO



"THE GRIT WITH EXTRA GRINDING SURFACES"

This hard, insoluble granite grit grinds feed...lets birds make better use of feed ingredients... lets you step up Feeding Efficiency

Buy *good* feed, of course! Be sure it's well-balanced!

And use a *good* grinding agent to get the most out of that feed.

These are the steps that help you get high feed efficiency and stretch your feed dollar.

You won't have a *good* grinding agent unless it's *hard and insoluble. GRANITE GRIT IS!* And leading poultrymen throughout the country say STONEMO is their choice.

Birds put STONEMO to work more easily because it has multiple, rough, hard-cutting surfaces. It grinds feed finely—won't dissolve—won't upset mineral balance of ration. It lets birds assimilate feed, lets them get better nutritional value out of every pound of feed. You save feed costs!

Insist on STONEMO. Get it from your feed or poultry supply dealer!

• • •

Free! Valuable, illustrated folder on the importance of GRIT in reducing feed costs. Write for yours! Mail the coupon below today.

Stone Mountain Grit Company
Dept. FQA
Lithonia, Georgia

Please send folders on the importance of GRIT in reducing feed costs.

☐ For Chickens ☐ For Broilers ☐ For Turkeys

Name_____

Route or Street_____

Town_____ State_____

Poultry Yard

Late and Rapid Molters Lay Well An average flock will produce 18 to 24 per cent fewer eggs during the second laying season than they did as yearlings. The low producing birds should be sold. There are exceptional birds, however, which will lay as well the second year as they did the first and should certainly be kept. Fortunately, these birds can be quickly identified; they are usually the late, rapid molters. If a hen hasn't started molting by the first of October she can be expected to perform well as a layer during the next year.

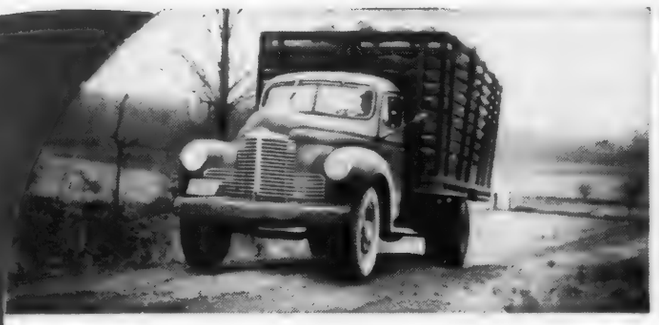
A hen starts molting when she stops laying. She loses the feathers from her neck first, then from the back, and finally from the wings and body. The ten primary feathers on each wing she drops one at a time at two week intervals, so that 18 to 20 weeks are required for her to lose all the primaries and another six weeks until the last of the new feathers has reached its full length. By checking the number of old primaries still in the wing and by estimating the length of time the new feathers have been growing, it is possible to determine at any time how long a bird has been molting.

Smoked Turkey for the Farm Gourmet Smoked poultry—turkey, chicken, duck, or guinea—make a mouth-watering delicacy that should be eaten on festive occasions by those who love good food. A new curing and smoking process has been developed by two Canadian experts, G. A. Grant and W. H. White, which improves the keeping quality of the birds. For curing, the birds are immersed for a day in brine that is held at 40 degrees fahrenheit. (To make this brine: dissolve one pound four ounces of common table salt and seven-tenths of an ounce of Chile saltpeter—called sodium nitrate at the drug store—in a gallon of water.) After they have drained, the birds are matured for five to six days at 40 degrees fahrenheit and are then soaked in clear water four hours. The final step is to smoke the birds for five to six hours at 140 degrees, preferably in an atmosphere of about 35 per cent humidity. Apple wood or hickory are traditional woods for meat smoking fires. Applewood is preferred for a blander flavor.

When the smoking process is over the bird is ready to be eaten, though they are often steamed to make the meat a little moister. If this process seems like too much trouble, you can buy smoked poultry at any good food shop at $2.50 a pound and up, but it won't have the home-made flavor.

ONE EATON 2-Speed Axle

helps 2-man team handle 860 acre farm!



All-American team — W. E. Walters and his son Bill keep this International on the go on their big Tennessee farm. "Never had a bit of trouble with our Eaton 2-Speed," says Walters, "and we used to have plenty before we knew about these axles."

All for 'em! Floyd White, International dealer of Pulaski, Tennessee, knows his Eatons. Says he: "There's a strong demand for Eaton 2-Speed Axles. We're set up to handle them and have a real service setup, too."

IT TAKES plenty of hustle to keep an 860-acre farm turning out grain, hay and Herefords — a big job for two men.

And it takes a truck that can roll a load over plowed ground without a holdup — one that can make hour-saving time on the highway, too.

Head man of the team—W. E. Walters—finds an Eaton-equipped International just what the job takes. He has to haul feed and grain over all kinds of going, and cattle long distances to market. "I wouldn't buy a truck without an Eaton 2-Speed," he says.

Eaton 2-Speeds give you double the number of available gear ratios. In the low range, extra "pull" to lick the toughest going. In the high range, extra speed that cuts time on highways — saves gas, engine wear and cost of upkeep.

Ask your dealer about Eaton 2-Speed Axles — they can save you plenty in time, trouble and dollars.

EATON 2-SPEED *Truck* AXLES

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO

MORE THAN A MILLION IN TRUCKS TODAY

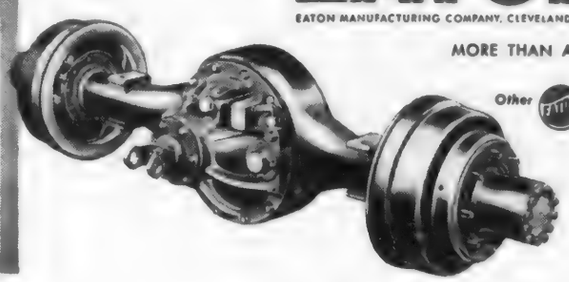
IT'S A SNAP TO SHIFT

1. MOVE BUTTON
2. PUSH PEDAL

and your speed ratios ● ● ● ●

are now doubled ●● ●● ●● ●●

enabling you to match the load to the road saving engine, time and fuel.

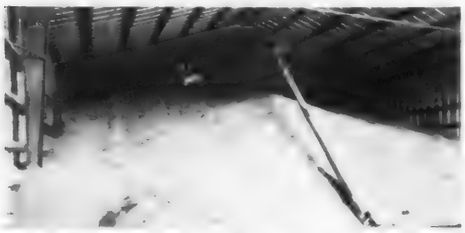


Other EATON Products: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Rotor Pumps • Conventional Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Spring Washers and Screw Assembly (Springtites) Snap Rings • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers.

You Can Save On Farm Building Costs with BUTLER Steel Buildings

DAIRY BARN—Plenty of space in Butler Buildings to install complete equipment for a modern, well-ventilated, up-to-date milking parlor.

IMPLEMENT SHELTER—Butler open front Utility Building protects valuable farm equipment . . . can be used for many other purposes.



GRAIN STORAGE—Photo shows full usable space of Butler Building, specially designed for grain storage. No shoring or cribbing needed.

FEED STORAGE and CATTLE BARN—Two farm storage and shelter needs are served by one Butler Building. Note specially constructed lean-to.

Easily Adaptable to All types of Farm Buildings

Make permanent farm improvements now—*and save*—with Butler Steel Buildings.

You can use these adaptable, low-cost buildings for any farm purpose. No maintenance or painting is necessary. Rodents and termites can't damage them. You have a permanent, all-metal building that lasts for years. Easily insulated if your needs require it.

Butler Steel Buildings erected more than 40 years ago are still in use today . . . in good condition, ready for many more years of service!

For complete information, mail coupon today.

BUTLER Steel Buildings

The Mark of BUTLER *Better Quality*

BUTLER MANUFACTURING COMPANY

Kansas City, Mo.
Galesburg, Ill.
Richmond, Calif.
Birmingham, Ala.
Minneapolis, Minn.

For Prompt Reply, Address Dept. Q29 at Office Nearest You:
7378 E. 13th St., Kansas City 3-E. Mo.
978HH 6th Ave., S.E., Minneapolis 14, Minn.
Richmond, Calif.

Please send information on Butler Buildings.

NAME_____

P.O._____ R.F.D._____

STATE_____

The Dairy Barn

A BRIEF SUMMARY OF THE NEWEST DEVELOPMENTS IN DAIRYING AND THE CARE OF DAIRY CATTLE.

What Makes A Good DHIA?

Some Dairy Herd Improvement Associations do a good job for members, some not so good. This is widely known among dairymen and P. E. McNall, of the University of Wisconsin figured that finding what makes the good ones good would help all DHIA groups do a better job. McNall made a detailed study of 31 Wisconsin cooperatives. He found that 21 of them lost an average of $208 for the year while the remaining 10 cleared an average of slightly over $1,000.

His studies resulted in these rules for success:

1. The type of cooperative set up should be styled to the amount of work for it. Where the cow population is limited, having one man work full time is better than hiring a field man part time. Part-time employment for a field man tends to cause divided interest and often leads to poor work.

Where there are more cows or more interest among farmers, a two-man team that does both laboratory and field work is best. A laboratory is set up at some central point rather than being moved from farm to farm, as would be the case with a one-man service where all the work is done in the field.

2. Wages are the biggest expense a cooperative has, but they should not consume more than 80 per cent of the income if the cooperative is to operate in the black. Usually, office, laboratory, director, rent, water, electricity, postage and other expenses take about 10 to 12 per cent of the income, which should leave 8 to 10 percent for savings.

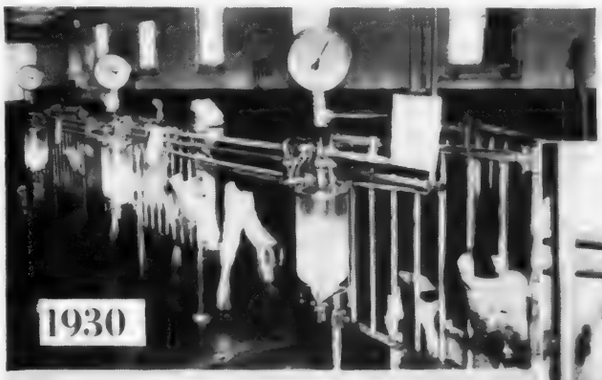
3. The best way to establish the field man's wage is to pay him 55 to 60 per cent of the income from the members he serves. This covers both wages and mileage. A flat monthly wage has been tried often, but has worked well in only a few cases. Including mileage in the wage percentage figure leads to better planning of field trips and works out better than a lower wage plus expenses.

4. A technically trained supervisor should spend a few days with the laboratory technician to work out time-saving methods to hold down costs. Laboratory costs vary greatly, either because of poor arrangement and too little equipment, or because there is not enough testing to keep the technician busy.

5. Nearly half the cooperatives studied did extra testing for such non-members as creameries and cheese factories. The

(Continued on page 93)

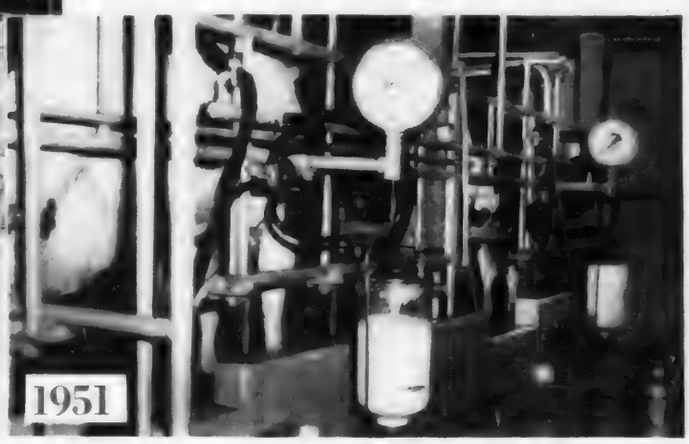
21 YEARS OF DE LAVAL COMBINE MILKING



Grover G. Meyer and Sons, Basehor, Kansas, installed this De Laval Combine Milker in 1930 in their milking parlor built in 1925 and said to be the first in the U. S.

"BEST IN MILKING"

Says Grover G. Meyer and Sons



Recently Grover G. Meyer and Sons installed this new De Laval Combine in their new milking parlor because 21 years of experience convinced them it was "the best in milking"

In 1925 Grover G. Meyer and Sons, Basehor, Kansas, built what is said to be the first milking parlor in the U. S. For five years they used a De Laval pail-type milker in their original milking parlor and in 1930 installed one of the first De Laval Combine Milkers to be placed in operation.

They have recently built a new milking parlor and in it they have installed a new De Laval Combine Milker. Mr. Meyer writes:

"We have had a lot of pleasure and satisfaction in using this milker and certainly, after 21 years of operation and experience with this type of milking, we would not have placed another De Laval Combine Milker in use if we did not think it was the **best in milking.**"

Learn the facts yourself about the De Laval Combine Milker, the original milker of this type, **and the only one with 21 years of successful milking experience behind it on hundreds of farms.**

A typical Meyer Holstein—Madge Speckel Aurora, No. 2336226, a member of their all-registered Holstein herd. She is classified "Excellent" and was All-Kansas cow in 1947 and 1948. Production at 7 years, 8 months, in 321 days, was 18,365 lbs. milk and 689.1 lbs. fat, 3.8%. Record made on twice-a-day milking under Holstein-Friesian Association of America supervision.

De Laval

THE DE LAVAL SEPARATOR COMPANY

165 Broadway, New York 6, N. Y.

427 Randolph St., Chicago 6, Ill. • 61 Beale St., San Francisco 5, Cal.

DE LAVAL COMBINE MILKING SYSTEMS

DIRECT FROM COW TO CAN

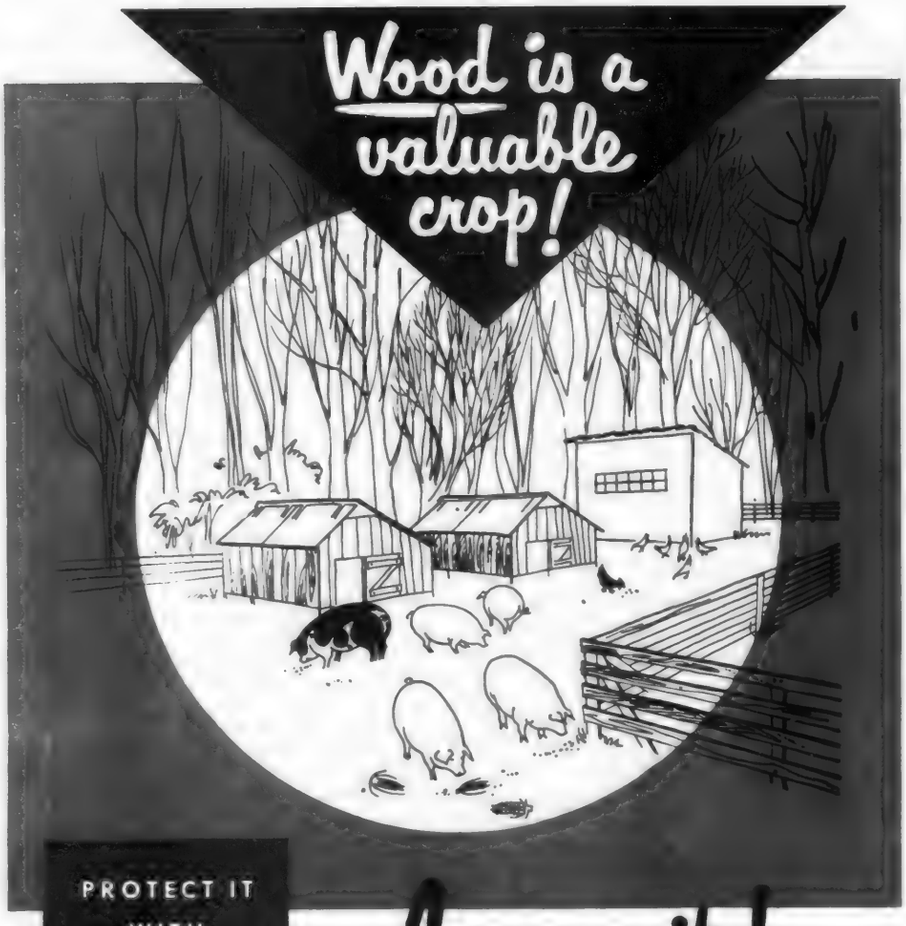
The De Laval Separator Co., Dept. W-38, 165 Broadway, New York 6, N. Y.

Please send me interesting new printed matter on:

☐ The De Laval Model F Combine Milker

Name_____

Town_____ R. F. D._____ State_____



PROTECT IT WITH Penta*

Write Dow for Name of Your Nearest Dealer

Conserve it!

Penta makes posts, barns, hog and hen houses resist rot and termites!

Protect your posts and barns! Reduce time and money spent in repairing all your wood structures. Protect with PENTA—the *clean* wood preservative!

PENTA makes posts and lumber last two to four times *longer*, efficiently protecting them from termites and rot.

You can buy PENTA solutions in 5 gallon cans and 55 gallon drums. Apply it yourself to existing, unpainted buildings. Watch them last longer! Stay fresher looking! And for new buildings that must withstand severe outdoor exposure, ask your lumber dealer for PENTA-PROTECTED WOOD. This will save your time, money, AND wood!

*PENTA is a popular abbreviation of the name of the chemical, PENTAchlorophenol.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

Write for free booklet "Before You Build Your Barn."

The Dow Chemical Company
Dept. PE-44
Midland, Michigan

Name _____

Address _____

City _____ State _____

DOW Penta chlorophenol

THE FARM'S PICTURES

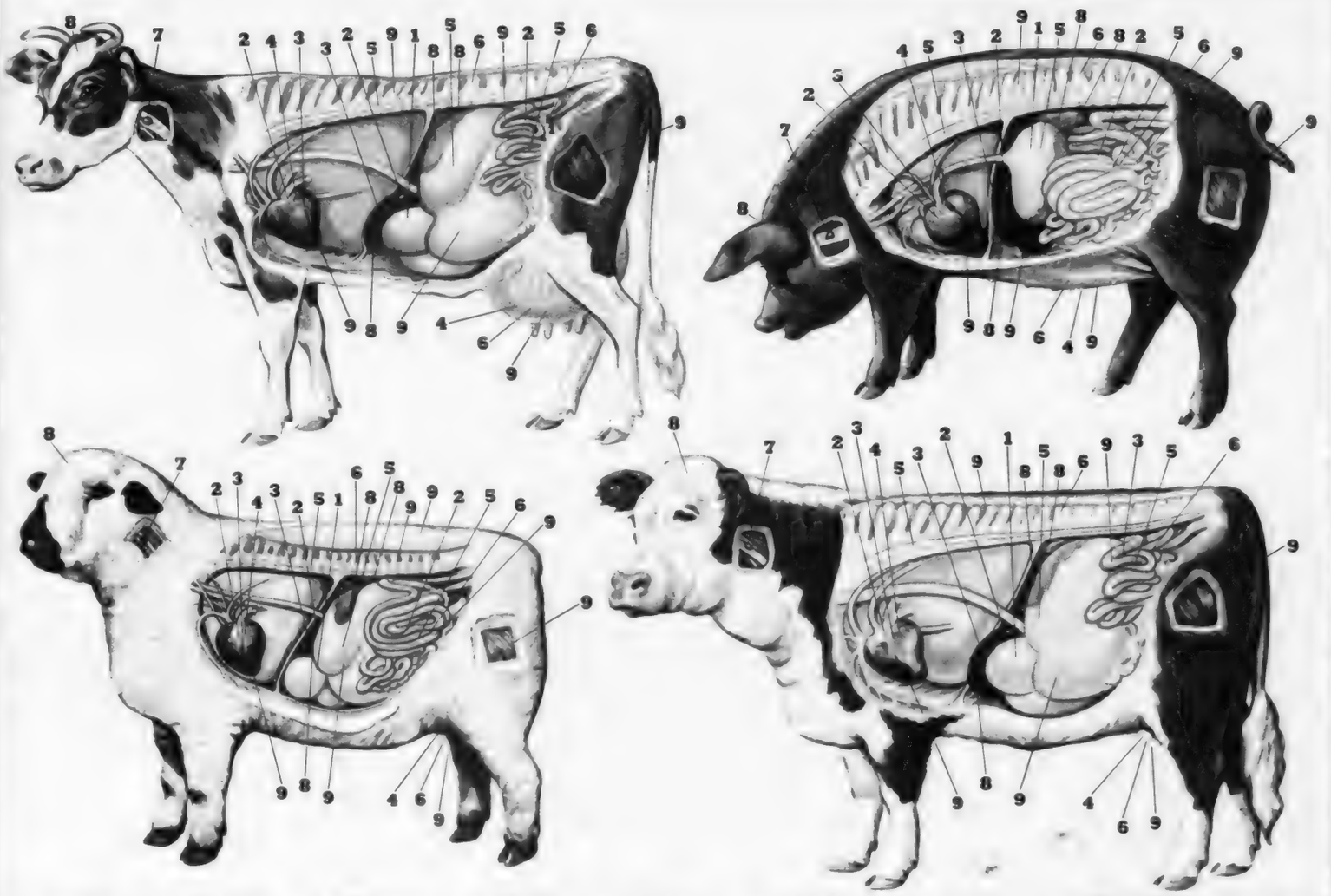
Barn muralist Engebretson's home work —see page 71

COVER: PORTRAIT OF A SPANISH FARMER

By R. J. McGinnis

5—Turismo Espana. 16—Angus McDougall. 22 and 23—R. J. McGinnis. 24—Amparin Ibanaz. 25 and 26—R. J. McGinnis. 27—K. Pazovski. 28 and 29—R. J. McGinnis. 30—J. B. Fabry. 31—Joseph Janney Steinmetz; U. S. Army Signal Corps. 32 through 35—Joe Munroe. 36—Grant Cannon. 37 through 39—Joe Munroe. 40—Dorothy Norman. 41—Alberta Strauss. 42—Joseph Janney Steinmetz. 43—Joe Munroe; Joseph Janney Steinmetz. 44—Paul A. Moore-*Tenn. Conservation Dept.* 45—*SCS-USDA*-Gordon S. Smith. 46—*SCS-USDA;* J. W. McManigal; Carl Mansfield. 47—George Laycock. 48—Dr. Reginald H. Painter; USDA. 49—Dr. Reginald H. Painter; USDA. 50 through 52—Charles Nelson. 53—George Laycock; Charles Nelson. 56—George Hoxie. 58—Parris Emery. 59—Fred Knoop. 60—Jane Latta. 61—George Laycock; Jane Latta. 62 through 65—David L. Strout. 66—Virginia's Studios. 67—Cy La Tour. 68—Joe Munroe. 69—Lew Merrim *from Monkmeyer.* 70 and 71—Angus McDougall. 72—Watson *from Monkmeyer.* 73—The Bettman Archive; Gladys Relyea-*Pix.* 74—Watson *from Monkmeyer;* Bern Keating from *Black Star.* 75—Bob Taylor; Elemore Morgan; Harper & Bro.; Dope-*Pix.* 76—Bob Taylor. 77—W. Eugene Smith-*Black Star.* 78 and 79—Clarence Pfefferkorn. 82—R. J. McGinnis. 138—R. J. McGinnis.

LINDA: Alberta Strauss, who both painted and profiled Linda, lives a quiet and domestic life in Glendale, Ohio. She is the wife of a Cincinnati attorney and mother of a sixteen-year-old boy. She had a strict upbringing in a rural community settled by her Presbyterian ancestors, followed by many years of university study. Although more student of the arts than artist, her infrequent paintings emerge strong and peculiarly untouched by any borrowed academic style. Occasionally, by invitation or commission, she tries her hand at prose. The portrait of Linda is the second of her works published by *Farm Quarterly.*



1 CHLORINE (from salt) is the active ingredient of hydrochloric acid needed to break the hard shell of protein cells and put them into digestible form. Hydrochloric acid also makes iron more assimilable.

2 SODIUM (from salt) needed for bile to help digest fats and carbohydrates. Controls internal or osmotic body pressures that move nutrients from cell to cell. Sodium also helps in toning up the heart muscle.

3 IRON. Needed to make the red blood cells in the bone marrow that carry oxygen to all body cells so that nutrients can be utilized. Iron is also needed by a healthy, active liver. Also needed by certain enzymes.

4 COPPER. Works with iron in the formation of hemoglobin or red blood cells in the bone marrow. Lack of copper can cause breeding failures. Copper is also a part of important enzyme systems.

5 COBALT. Stimulates the bone marrow where blood is made. Cobalt also promotes healthy intestinal flora which stimulates the assimilation of feed. Cobalt is an important part of the vitamin B12.

6 MANGANESE. Needed for reproduction, big milk flow. Manganese works with calcium for sound bone growth. Like cobalt, it also sets up a healthy intestinal condition for better feed assimilation.

7 IODINE. Required for thyroxine in the thyroid gland which controls all bodily activities — growth, repair, reproduction, feed assimilation. Thyroxine prevents goitre or big neck, hairlessness in pigs.

8 ZINC. Needed by various body organs, principally the kidneys, liver, spleen, brain, and sex organs. The pancreas is very rich in zinc, indicating that it plays an important role in the digestion and use of carbohydrates.

9 TRACE MINERALS, individually and in combination, activate important enzyme, vitamin, hormone functions — the basic life processes that convert feed nutrients into growth, repair, reproduction.

Build your mineral feeding program around *Morton's Trace Mineralized Salt*

THE animal body is a combination of water, protein, fat and minerals, with minerals accounting for the smallest, yet a vitally important part.

Minerals make up a large part of the bone structure. They are found in blood, muscle tissue, and vital organs. In addition, they help control the enzyme, vitamin, and hormone functions. These highly complex, delicately balanced activities convert feed into nutrients and, in turn, build nutrients into growth, heavy production, and healthy young.

That is why minerals, both the major and the trace minerals, are so vital to healthy, thrifty livestock.

Nature intended that livestock should get their minerals through the feed they eat. Wind, sheet, and gulley erosion and heavy cropping, however, have taken much of the original supply of trace minerals from our soils . . . and from our crops. Your animals need an additional mineral ration.

The easy, safe and economical way to feed these supplementary minerals is to put a supply of Morton's Trace Mineralized Salt in one side of a divided mineral box and a mixture of bone meal and ground limestone or similar good source of calcium and phosphorus in the other.

Recommended by leading animal nutritionists, this simple plan provides for the minerals which are needed in quantity — calcium, phosphorus and salt. It also supplies, through the salt, the trace minerals — cobalt, manganese, iron, copper, iodine and zinc which are needed only in very small amounts.

Fed free choice, this Morton plan supplies a balanced mineral ration. Your dairy cows, beef animals, hogs, and sheep will take what they want and need for thrifty use of feed, rapid gains, good reproduction. Ask your dealer for Morton's Trace Mineralized Salt — feed it free choice.

FREE — Just off the press, this 32-page book gives you the complete facts on feeding salt and trace minerals to all classes of animals . . . shows how and why salt and trace minerals are so necessary for low feeding costs and maximum livestock profits. Mailed free and postpaid. Morton Salt Co., P. O. Box 781, Chicago 90, Ill.

NOW!...You can keep 'em gaining right through weaning!

EASY TO FEED
Just dilute with water and pour in a trough

SPARX

The New Replacement for Sow's Milk

HELPS STOP WEANING SETBACKS

CUSHION "SHOCK" AT WEANING: Sparx, the new Semi-Solid buttermilk product, helps keep your baby pigs gaining right through weaning. Sparx is a feed closer to sow's milk than anything ever sold before . . . a feed baby pigs love. Start feeding Sparx the fifth week to supplement sow's milk before weaning. Feed it until the 12th week to replace sow's milk after weaning. Pigs scarcely miss their mothers; weigh up to 50% more than national average at weaning. Growthy shotes average as much as 75 lbs. in 90 days or less.

SAVE MORE PIGS—EVEN "ORPHANS": Sparx is such a complete replacement for sow's milk that it helps make pigs independent of sow's milk flow. Baby pigs drink Sparx before they are big enough to rustle for pasture and dry feed. Orphan pigs, pigs with insufficient milk from extra-large litters or sows that "dry up" . . . all can be helped to live and make a profit. Whenever sow's milk is lacking, feed Sparx.

MAKE HOGS OF RUNTS: Even pigs that are born small or start slowly have a chance to "catch up" if you pep up their appetites and boost their feed intake with Sparx. Start Sparx as early as the third week if your litters are uneven. You'll wean a more uniform bunch of pigs. Sparx will speed up your slow growers; help you market *all* your pigs in six months or less.

HELP PIGS RECUPERATE: Sparx helps pigs recover from possible set-backs of castration, vaccination, bad weather, digestive or nutritional disorders, some diseases and parasites. You know the value of buttermilk for health diets. What could be better than evaporated *buttermilk* as a "trouble shooter" food for pigs? That's the base of Sparx. Powerful vitamin, energy and appetite factors are added to round out a feed that's tops in protective and recuperative value.

FEED WHENEVER SOW'S MILK SLACKENS

AT YOUR FEED DEALER'S NOW **SPARX** ***FOR BABY PIGS***

© 1951

CONSOLIDATED PRODUCTS COMPANY C P CO **DANVILLE, ILLINOIS**

Division Offices: Princeton, N. J. • Des Moines, Ia. • Sacramento, Calif.

Makers of Semi-Solid Buttermilk, Semi-Solid Emulsions and Kaff-A

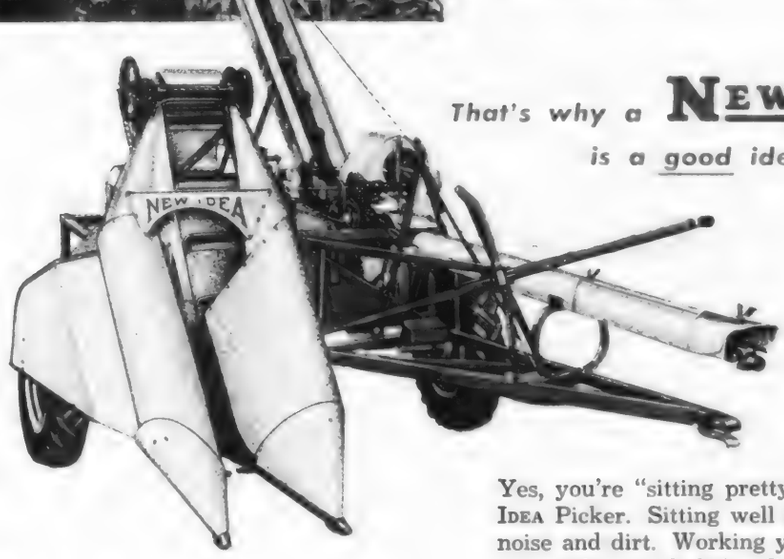
MORE EARS... FEWER HUSKS FASTER PICKING

Thick ears, thin ears, runty nubbins — on straight stalks, crooked stalks, or tangled and down stalks — your NEW IDEA Picker leaves your fields clean.

Flexible floating points team with low-reaching gathering chains to catch down stalks. Blunt-end snapping rolls bring the ears through with least loss or crushing. Even the "handful" of corn shelled in husking goes on the wagon.

You crib cleaner corn, too. Ears pass steadily under two sets of presser wheels — closely hugging the sure-action husking rolls. Husks are quickly loosened and off in a hurry. A powerful cleaning fan finishes the job by blowing away all waste.

And it's a faster harvest from start to finish. Takes mere minutes to hitch or unhitch your NEW IDEA Picker. Lighter in draft because it's correctly balanced. Completely self-contained. Easily controlled. Built in every way to save hours as well as ears!



That's why a **NEW IDEA** *is a good idea!*

NEW IDEA Two-Row Picker (top view) handles 12 to 18 acres per day. ***NEW IDEA One-Row Corn Picker*** (above) picks, husks and loads 8 to 12 acres daily. Both are one-man rigs. Rear-mounted elevator is standard on both types.

Yes, you're "sitting pretty" with a NEW IDEA Picker. Sitting well away from the noise and dirt. Working your field without costly outside help. Getting your full acre's worth of corn year after year! If you don't own a NEW IDEA Picker — *now* is a mighty good time to see your NEW IDEA Dealer.

NEW IDEA FARM EQUIPMENT COMPANY

SUBSIDIARY AVCO MANUFACTURING CORPORATION

Dept. 313, Coldwater, Ohio

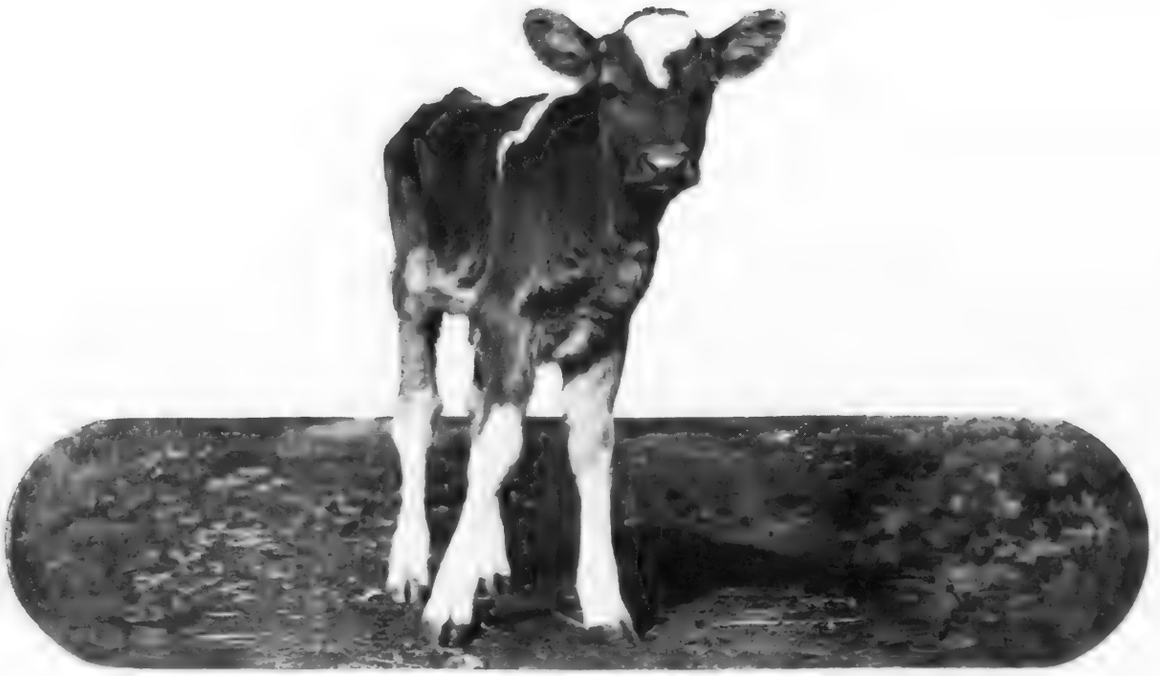
Send FREE illustrated literature as checked:

- ☐ One-Row Corn Pickers
- ☐ Two-Row Corn Pickers
- ☐ One-Row Corn Snappers
- ☐ Stalk Shredders
- ☐ All-Purpose Elevators
- ☐ All-Steel Wagons
- ☐ Steel Wagon Boxes
- ☐ Hand Corn Shellers
- ☐ Tractor Mowers
- ☐ 4-Bar Rakes & Tedders
- ☐ Hay Loaders
- ☐ Manure Spreaders
- ☐ Horn-draulic Loaders
- ☐ Lime Spreaders
- ☐ Transplanters

Name_____

Address_____

Mail coupon today for free illustrated literature!



Now—raise growthier calves with SUPERSOL—it's thrifty, too!

Whatever you feed as a calf starter, include SUPERSOL. This nutrient-packed, natural supplement is *extra* rich in the foods your calves need for healthy, rapid growth.

And, SUPERSOL is simple to feed.

Just add a small amount of SUPERSOL to your starter ration—or make your own calf feed with home-grown grains, oil meal and SUPERSOL.

You'll find SUPERSOL is economical, too—for you add so little to get so much. SUPERSOL is the key to superior rations . . . not only for calves, but for *all* livestock—*PROVEN BY RESULTS!*

SUPERSOL

The Natural Supplement for All Livestock

Write for FREE Booklet

FEED DIVISION

BROWN-FORMAN DISTILLERS CORPORATION

at LOUISVILLE *in* KENTUCKY

MORE CORN in the wagon

with your own 1-Row or 2-Row Corn Harvester

Wait until corn has the right "feel" for picking . . . then crib it quick! Out-maneuver bad weather, birds and borers. Correct timing can save wagonloads of extra corn. That's why you need an Allis-Chalmers power picker of your own.

Both the 2-Row Mounted and 1-Row Pull-type CORN HARVESTERS have low sloping "ear-finder" gathering rolls that seek out elusive ears. Both have low-to-the-ground streamlining that noses under broken stalks. Revolving spider wheels gather in corn leaning at all angles.

Compact, perfectly balanced CORN HARVESTERS are go-anywhere pickers. Operate in muddy fields or on hillsides if you have to. You sit safely in the clear with a straight-ahead view. Shielded rubber husking rolls are long, low, out of danger's way. And they shell less corn.

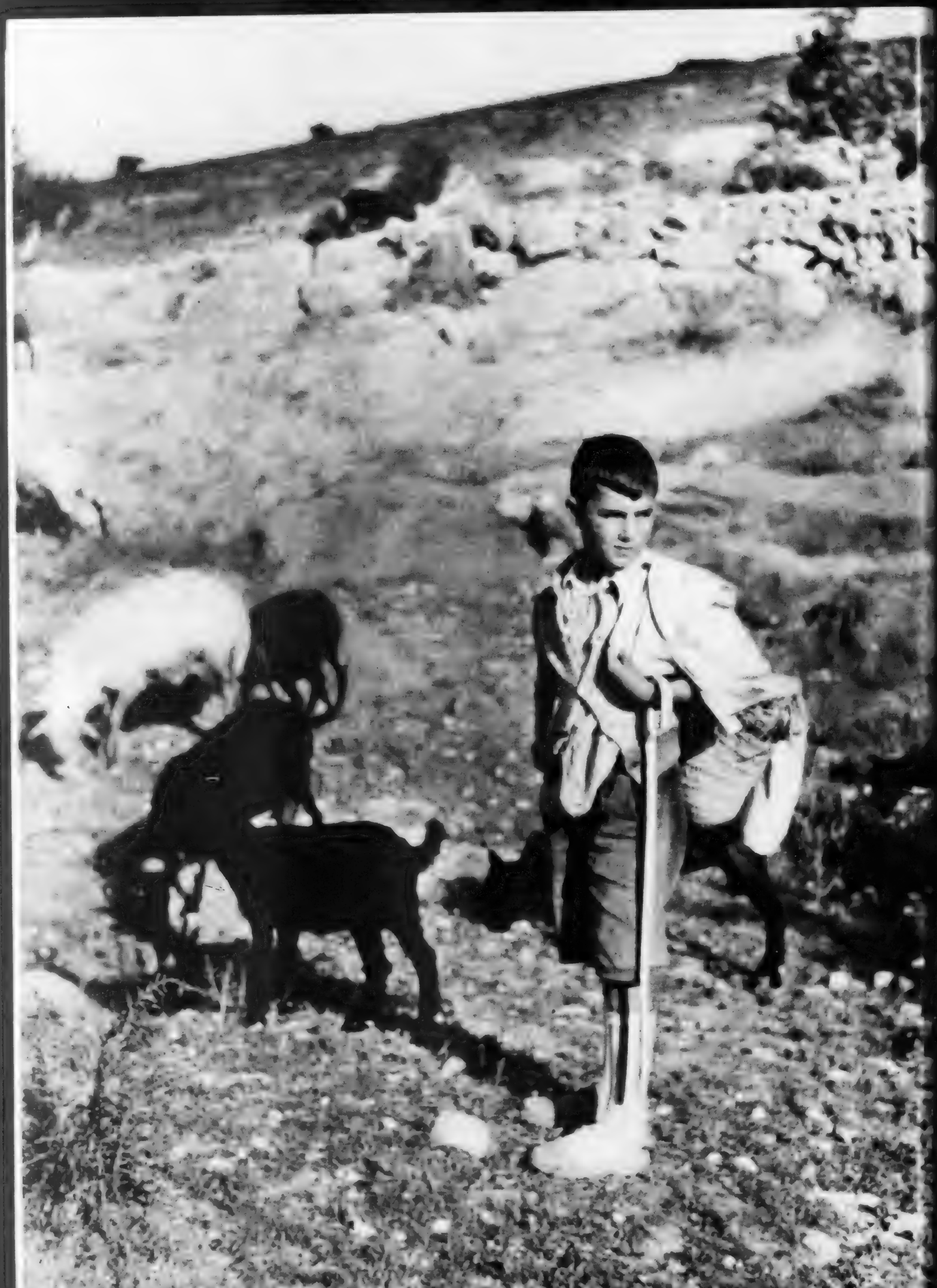
Fast! Safe! That's modern husking as it can be on your farm, with a home-owned CORN HARVESTER ready for action!

The 2-Row CORN HARVESTER is under-mounted on the WD or WC Tractor in 30 minutes.

The new 1-Row CORN HARVESTER operates with any make of tractor. Like the 2-Row, it's priced for *home ownership.*

ALLIS-CHALMERS

TRACTOR DIVISION · MILWAUKEE 1, U. S. A.



THE FARMS OF SPAIN

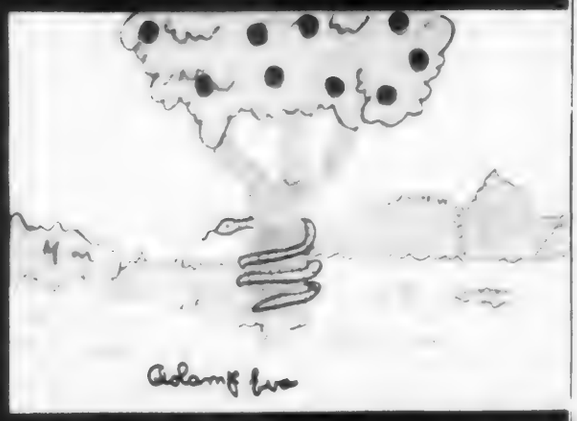
BY R. J. McGINNIS

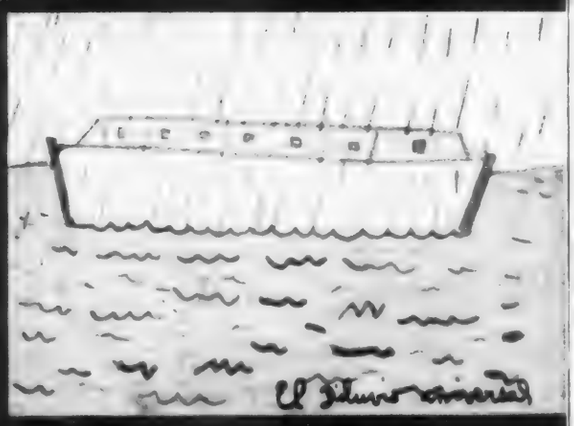
Antonio Castillo Alvarez faced his two hired hands across the little table in his kitchen. He had a serious problem on his hands. There was Jose, hard working, sober, a man to trust; but there was Manuel, a gay fellow it is true, but a loafer who went to sleep in the shadow of his mules if he wasn't watched.

Antonio had paid them their two weeks' cash wages, and now, while his wife Ana was weighing out their beans on the Roman balances, he tried to figure out a way to give Jose a bonus without making a rebel out of Manuel.

By contract, Antonio pays Jose and Manuel each 18.75 pesetas (47c) a day in cash, 50 kilos (120 lbs.) of beans in May, three chickens suitable for the pot at Christmas time, and such other produce as the state of the crop, the workers' diligence, and his own generosity dictated. Today Antonio felt generous. It had rained for a solid week and prospects looked good after the dreadful drought last year. So he sent Manuel after the hamper of potatoes in the storeroom and gave each man 10 kilos as a bonus. While Manuel was gone he added 2 measures of beans to Jose's bag and was assured that the Saints would reward such generosity with a bountiful crop and great age.

ABOVE LEFT: The bitter cold of the Spanish plateau chills old bones and the sun is good when spring comes. RIGHT: A sewing machine is a mark of affluence. This one is fifty years old and is owned by Senora Alvarez. LOWER LEFT: The wine-keeper at Serdon Farm blends fine Sherry; he supervises the making of 50,000 gallons of assorted wines each year. RIGHT: One well serves this village of 300 people. Every family has its own rope and bucket.





Antonio has 56 hectares of land, about 135 American acres, 20 miles west of the ancient city of Cordoba. This is a sizable farm in Spain, and in midwest America that many acres should make a farmer a respectable living. But Antonio's farm, like the farms of two-thirds of Spain, is on the great central plateau where rainfall rarely exceeds 12 inches a year. With the exception of one acre which he irrigates from a well near the farm house, he cultivates his 135 acres according to dry farming methods first developed by Roman colonists 2,000 years ago. He gets about 2 crops every three years with this type of dry farming.

Those fields which have been in crops are plowed during the winter or early spring. The Roman plow is used. It does not turn the earth as does our mold board plow, but leaves needed crop residue on the surface. From time to time during the following year the ground is worked, especially after the infrequent rains, but no crop is planted this year. There is sufficient moisture stored by the second spring to raise a crop.

This year he has 53 acres of wheat, 10 acres of barley and 2½ acres of oats. The remainder is fallow, but when the rainfall justifies it, he will plant short crops in the fallow fields. On these this year he has 30 acres of garbanzos, the favorite eating bean of the Spanish (and a noble bean it is, with a fine, full flavor), 10 acres of cotton, 7½ acres of beans for animal feed, and enough potatoes for the family.

To work his 135 acres, he has two year 'round laborers. He adds to this his own work, that of his 16-year-old son, and the women of his family during the busy season. Normally he has 4 teams, 3 of mules and one of horses. Last year he ran into debt because of poor short crops and had to sell one of the teams of mules, which he must replace for the summer work.

He has a mixed herd of 30 goats and sheep but no cows, milking both the goats and sheep for the family milk and cheese. He has a hog, 80 laying hens and 2 dogs, the latter regarded as luxuries in Spain. During the harvest season he will have 4 to 6 additional laborers from the village and will pay them up to 35 pesetas, 85 cents in American money, per day. However, like his year 'round hands, he will pay the seasonal laborers partly in kind, a custom universal in Spain. This payment in kind ranges from a small part of the daily wages to almost all, and, depending on the area, may consist of potatoes, olive oil, wine, meat or flour.

For the last two years, Antonio had been unable to get fertilizer. Spain was a great fertilizer consumer when times were good, but the bad exchange situation has eliminated a great deal of Chilean and German nitrates. It takes tremendous amounts of pesetas to buy goods in the world markets because of the inflation in Spain. The country has potentially sufficient potassium and phosphorous. The manure from his goats and sheep he regards as more valuable than the wool or milk.

Antonio's wheat is normally harvested half by machine and half by hand. The sheaves are taken to the threshing floor in his barnyard, the grain is tramped out of the straw by horses, and is winnowed by hand. His machinery is crude and dilapidated: a Roman type plow, a harrow made by the village smith and an ancient McCormick harvester, almost every part of which has been replaced by home-made parts since it came from America 50 years ago. When he can, he rents a drill to plant his wheat, but almost always does a great deal by hand.

In this area wheat is the only important crop which comes under government regulations. Antonio's quota is set by a board of local and provincial agricultural authorities. Wheat raised on this minimum quota must be sold at a fixed low price of 2½ pesetas per kilo (1951). If he wishes he may plant more than

LEFT: Amparin Ibanez a little Spanish schoolgirl of Valencia, in simple faith and devotion, drew this story of the Bible, Adam and Eve, The Flood, The Nativity, and the Resurrection.

RIGHT: This is the Spanish soil, thin, stoney, dry, with the olive tree and the terrace, with the goats searching for the shy blade of grass, and the goatherd in his solitude.

the minimum quota and this he may sell on the free market at double the price. Quotas and ceiling prices on wheat and other basic foods are designed, the government says, to supply these necessities at a low price. For example, bread is relatively cheap, but the government feels that a low price can be maintained only by large scale production of price-fixed wheat. If no compulsory quota were set on acreage, farmers would plant more profitable crops.

The story of Spain, not only today but for many years, is the story of its struggle for bread; not bread as a symbol for food, but bread itself, for in Spain it is indeed the staff of life. No meal is complete without a half a loaf beside each place; children munch it while at play.

The farmer is caught up in this struggle for bread and he often complains that he is overlooked when prices are set. The agricultural economy centers around the growing of wheat, the processing of flour and bread, and the pricing and rationing of bread. The well-to-do can always manage enough bread; the farmer, poor as he might be, is at the source of supply and he eats well, too. But the workers in the cities, where the margin between enough and want is always very thin, are the first to cry, "Give us bread!" when the wheat crop is short, as it was in 1950.

Antonio's family of 4 boys and daughter is about the average in size. The Spanish believe in large families; 12 children excite no comment at all. Ana, the oldest child, a girl of 19, is not yet married, but blushes when the subject is discussed. Between Ana and Francisco, who is 4, there are three boys, Ignacio 16, Juan 14 and Antonio 12. Ignacio, two years out of school, makes a full hand on the farm.

When it is convenient the family attends church on Sunday. One gathers from Antonio that he goes to church more to please his women folk than from piety on his part. On rare occasions he hitches a team of mules to the cart and takes the family to Cordoba. The children will attend a movie, probably an ancient American picture. Ana, the mother, will visit a sister, and Antonio will indulge himself with a bottle of wine at a tavern.

"Myself, I do not like the motion pictures," he says. "They are foolish and only for women and children. More pleasure it is to me to see a field of ripening wheat."

Like all Spanish, he is a stubborn individualist, but he is regarded by his neighbors as a dangerous man in a horse trade and a very unusual fellow. He was a tenant

LEFT, TOP TO BOTTOM: The little church at Serdon Farm. Civil War reminder on the town hall wall at Toledo. Fountain in El Greco's garden. Cleaning and chopping beets for cow feed. RIGHT, TOP TO BOTTOM: A drifting laborer and his wife stop at Serdon Farm for work. Karakul sheep for pelts are common. Planting potatoes; the Spanish like to work in groups. Silo at Serdon; silos are rare because silage is scarce.

farmer until a few years ago when he bought the farm on which he lives. This, in Spain, where land prices are soaring and land for sale at any price is almost unknown, was a feat comparable to lifting himself by his own bootstraps. The self-denial and thrift which he must have practiced since he was old enough to lift a hoe would have made him a man of substance in any country.

A very wise man who knows the Spanish people well has said that of all the things money can buy, the Spaniard places food first. Then follows clothing and then the home. In this Antonio is thoroughly Spanish, for his family does eat bountifully, if with little variety. They stuff themselves three times a day with great quantities of bread, potatoes, beans, wine, olives and cheese. Meat is rare, and the one hog slaughtered each year is spread out very thin—a spoonful of fat for the beans, or a piece of ham to season the holiday pot. Fish is plentiful and good and in the spring there may be a lamb Antonio thinks he can spare.

The home has a clay tile floor and the cooking is done in a small fireplace over a minute fire. The kitchen-dining-living room, where the family spends most of its time indoors, has five doors—one to the outside, one to the storeroom, one to a hallway with three bedrooms, one to a tool shed, and one to the stable. The furniture is a mute reminder that the home is the third on the list of what Antonio believes is important in life. There are five hand-made chairs, an unpainted table, a small chest used for a seat, and the pride and joy of Mrs. Alvarez's life, a fifty-year-old Singer sewing machine. In May two hams still hung from the beams, mementoes of the pig

THE ALVAREZ DAUGHTER and friend squeeze goat curds for the family cheese. A spanish water jug will not stand on its own feet.

butchered last fall, along with the ever-present festoons of garlic, onions, and peppers. On one wall is a chromo of the Virgin, a pair of Roman balances and a shotgun, a means of free meat in the fall when rabbits and partridge are plentiful.

There is no plumbing, no electric appliances, and no radio, but Antonio proudly displays a new carbide lamp, very expensive, but very superior to candles or oil. His is one of the rare farms without electricity.

Facilities for bathing and sanitation in the rural districts are little better than they were in the time of Columbus. A kitchen with a sink becomes a shrine for the visiting housewife. The bacteria count of milk or even a standard for butter fat content are theories which the agricultural engineers know about, but they have not yet trickled down to the dairy farmer. In Madrid there are two prices, one for milk with 25 per cent water, and a cheaper price for milk with 50 per cent water added.

The acme of luxury in the villages is a bicycle. When irrigation was brought to the little village of La Mata del Parmo in 1940 the first surplus riches went to buy bicycles. One owner of 20 acres of good land bought each of his five children a machine. He explains to visitors, "In 1920 when we did dry farming there was not a single bicycle in the village. Now, with irrigation and 80 families we have 200."

An automobile? A radio? For Antonio an automobile is like wishing for an ocean-going yacht. A radio would be very pleasant, but when he thinks of the days of labor in the fields, the cost doesn't seem worth it. A tractor is something else again. A tractor, one of those bright colored American jobs, would permit him to dispense with three teams and his two regular laborers. But then there would be the manure problem. Tractors don't produce manure and the manure from the three teams is almost as important as the spring rains.

Antonio does not often indulge in wishful thinking. "My pleasure is making money," he concludes, "so that I can die rich. If I have a good year I put the money aside to educate my boys. I want them to be professional people in Cordoba."

This is a rare dream for a peasant farmer; but then Antonio was once a peasant laborer and now owns his own farm. He is indeed a very rare fellow.

SR. ANTONIO CASTILLO ALVAREZ and his family. Three of the older boys work in the fields. The oldest wants to be an engineer. The black arm bands show a recent death in the family. Later in the season the grape vine will shade the doorway.

The Villages of Spain

Antonio's farmhouse is in the midst of his fields. This is rare on the great central plateau, where the gregarious Spaniard likes to build his houses and barns in villages. Up north, around Barcelona and on the Atlantic coast, single farm houses set in the fields are common enough, but in Castile the farmers live in villages, often many miles from their fields.

The villages of Castile, built of adobe or stone, are the color of the vast barren plain around them. The houses and barns butt one against the other along narrow streets and alleys, running at crazy angles, always designed to shut out the glaring sun of summer, presenting a solid face of windowless and doorless walls to the outside.

Villages may be ten, fifteen, twenty miles apart. Each morning, riding their mules or oxen, the workers go out from the villages to the distant fields; each evening they mount their tired animals again for the long, slow miles to home. Long before they reach the village it is dark; the customary supper hour is 9:30. This is an old, old land, eroded and treeless. North of Vallodolid there is a stretch of countryside fifty miles square where there is no tree, hardly a sprout. Here in the schoolrooms the teacher hangs a picture of a tree, for most of the children have never seen this wonder of nature.

Built from the earth around them, the villages are the color of the fields and the distant hills, and seem a part of them as they squat in the white glare of the summer sun. Always there is the church, poking its simple tower above the dun-colored roofs.

The isolation, even in the villages, is incredible. Each is a world in itself, a world of barren plain and white hot sun in summer, cold and desolate in winter. Only in spring after the rains do the pastures and fields of grain offer a relief of green. To live among the fields in this isolation would be unbelievable, since there is no transportation except the backs of mules, no radios, no telephones, no near neighbors, and worst of all there is no water on the plain, for the only wells are in the villages where a single shaft often is the only source for man and beast. Everybody dreams of irrigated acres, but this too is limited by lack of water.

Spain is highly electrified. Even in the meanest hut there is often a light hanging from the ceiling and in the south the gypsy caves are wired for light. But on the average farm little other use is made of power. The customary rate is 6 pesetas per bulb per month.

The social life of the village centers around the casino, or tavern, but this is strictly for men only. Here there may be a moth-eaten pool table bought second hand from the city, and usually a radio, perhaps the only one in the village. A single light bulb hanging from the ceiling throws sharp shadows across the faces of the men as they stand around the tiny bar, drinking the wine of the region at a few cents a glass.

For the women there is the church and the priest who seeks through them to keep the men out of the hands of the devil. Here the women find an emotional outlet and one of their few means of self expression—a piece of lace for the altar, the commun-

THE BURRO AND THE MULE are the beasts of burden and work in much of Spain. The test for loading a burro is that if he stands up under a load he can travel with it. The bond between man and beast is close; the farmer spends more on fancy brass for harness than he spends on his wife's jewelry.

ion dress for the first daughter, the extra special dish of rice and chicken for the priest's Sunday dinner.

For the growing boys there is the pelota or hand ball court and the dreams that all boys have. In the villages of Spain it is a bicycle, perhaps a watch. The little girls dream of their first communion, of that happy age when they can dance at the festivals, and finally of marriage and the bearing of many children. School ends at fourteen; from then on life in the villages of Castile and Aragon and all the provinces of the great plateau is unceasing labor in the dust and heat of summer and the gray cold of winter.

By American standards this is not a gay life, but these are Spaniards, not Americans. They do not long for juke boxes and refrigerators as we sometimes think they

(Continued on page 136)

HYDROPONICS

BY PETER FABRIZIUS

DR. WILLIAM GERICKE, father of commercial hydroponics, harvests a crop of potatoes and corn from his wire seedbed.

THE mess-sergeants running the field kitchens in Korea and those operating the mess-halls on Okinawa, Guam, and Japan are stepping up their meals with vegetables that are grown without benefit of soil. Unsafe manure practices in those areas make soil-grown vegetables highly dangerous to eat. Two huge Army installations, one near Tokyo, the other near Kyoto, produce thousands of pounds of tomatoes, onions, lettuce and other vegetables every day and load them aboard transport planes to be flown to the troops. These truck crops are grown in gravel-filled tanks and fed three times a day by flooding them with chemical-filled water —a system popularly called hydroponics; by army terminology, nutriculture.

The Army gained experience in this form of agriculture during World War II when they operated soil-less gardens on Ascension Island, Iwo Jima, and in British Guiana. They have also drawn upon the experiences of the Standard and Shell Oil Companies, which operate beds at Aruba and Curacao, and on earlier work done on Wake Islands to provide fresh vegetables for the pre-war planes that stopped there and for the ground crew that serviced them. All of these installations were established for one primary reason—there wasn't enough good soil on the spot in which plants could be grown.

In Florida and other parts of the United States where there *is* plenty of good soil, commercial hydroponic beds have been built to raise vegetables and flowers in competition with gardeners using soil. One commercial grower, who has raised tons of tomatoes in his gravel-filled beds, said: "The most important piece of advice I could give anyone planning on going into hydroponics commercially is, 'Stay out. It'll break you.' If they don't follow that advice, there is just plenty they should know before they get started."

The beginnings of hydroponics go back to the time when men of science thought

Farming without soil is like making a parachute jump, too risky for normal use, but a life-saver in an emergency.

that all matter was composed of one or more of the "basic elements," fire, water, earth, and air. To find out which of the four element plants were made of, John Woodward, an Englishman, grew spearmint in rain water, in water from the River Thames, in water secured from a Hyde Park conduit, and in this same conduit water mixed with garden mould. By carefully measuring the amount of growth, he proved that the growth increased with the impurity of the water. This first hydroponic experiment, in 1699, laid to rest the belief which had been held for a century that plants were composed of water alone. It was not until almost 150 years later that hydroponics was reintroduced by Jean Bousingault, Julius von Sachs, and W. Knop as an important tool in finding the chemicals and the amount of them that a plant uses in growing. Since then scientists have found water cultures perfect for mixing exact amounts of plant foods and observing the reaction of plants to their broths.

The first efforts to turn this laboratory technique into a workable commercial method of raising plants came in 1929. In Berkeley, California, Dr. William Gericke, at that time, a professor at the University of California, began growing vegetables on a wire and straw seedbed suspended over a tank of nutrients where the plant roots could dip in and feed. At about this same time H. M. Biekart and C. H. Connors were growing carnations in sand and feeding them with dissolved nutrients at the New Jersey Agricultural Experiment Station. Professor Alex Laurie, at Ohio State University, began experimenting with flowers grown in sand in 1929, and in 1936 R. B. Withrow, at Purdue University, worked out the method of growing plants in gravel which is periodically flooded with chemical-bearing water. This gravel culture is the method now used in Japan and in most of the commercial establishments today. Although it is most commonly used, the proponents of the water culture technique fiercely deny that it is the best method.

Hydroponics

In his half-acre backyard Dr. William Gericke, who coined the word "hydroponics" (it means "water at work") to describe his system of growing plants, consistently grows as much corn, berries and vegetables as the average farmer grows on 20 acres. On a bed of some 60 square feet he gets an annual crop of 180 pounds of potatoes, plus 240 pounds of tomatoes, plus 150 pounds of onions, plus 100 heads of cabbage.

Gericke, a tall, broad-shouldered man of 65, can usually be found working in his backyard with his odd tanks. These tanks, which are 2½ feet wide, 24 feet long and 6 inches deep, are covered with a lid—a frame covered with chicken wire which supports a matting of straw, wood shavings, weeds, sawdust or other suitable litter. This is his seedbed. Into this he plants his seeds, or transplants seedlings, which send their roots down through the litter and into the nutrient solution in the tank below. Between litter bed and solution is an all-important two-inch space —in this moist air the roots are able to breathe without drying out.

On each of these seedbeds Gericke usually has several crops growing. It is not uncommon to find tomato vines pushing up from a bushy mass of potato plants and loganberry bushes towering over both. Gericke will lift one of the beds to show the white, dripping roots that reach down into the basin below. "Close planting and interplanting is the secret to the yields that everybody calls fantastic," he said, "but I've worked it out so that I can get them every time. Proper use of hydroponics can produce fifty times the average of field yields."

As an example of his methods he described the planting of a bed that produces his year's supply of vegetables. "Hydroponic roots can crowd for food," he explains, "but you cannot crowd green leaves for light. It's the place in the sun that counts." Early in January he plants the entire bed to onions which dip their roots into the tank and push their leaves into the light. About four weeks before the foliage begins to decline, he plants potatoes. By the time the potato leaves are ready to soak up sunshine, the onion plants have passed their maximum light requirements. The potatoes now take over while the onions mature in the shade.

When the potato plants have begun to wither, the bed is planted to large tomato seedlings which had been grown to transplanting stage in another tray. Each tomato plant is pruned to a single vine which is supported by twine tied to a framewood above the bed. In the fall, when the tomatoes have been harvested, the bed may be planted to broccoli or some other crop that grows well in California's mild winter.

The problem of chemicals, which he adds to the water in the tanks twice a year, is no longer of great concern to Gericke. As far as he is concerned, that problem is solved, the formulae are available, and he is on the track of more important findings. "Where we all made our mistake was to think too much about chemicals. Look at this earth," he said, picking up a handful of soil that leads a frustrated life in his garden. "Only one thousandth of one per cent of it are minerals. What about the other 99.99 per cent? Don't they have any function in plant growth?"

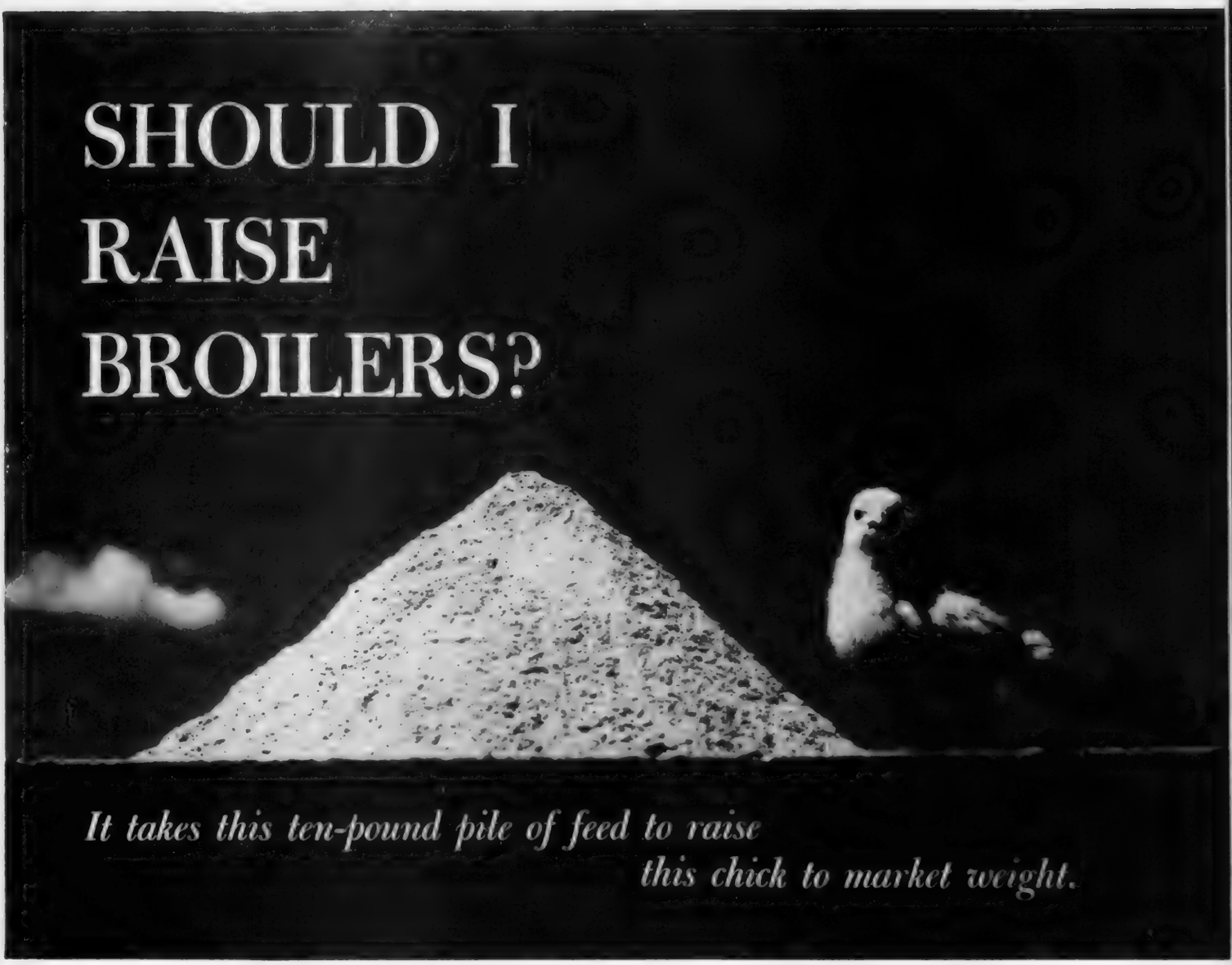
(Continued on page 107)

CONCRETE BEDS are coated with tar to prevent chemical reaction. Half tiles provide a channel for feeding and draining the solution from the gravel filled beds.

THE SOLUTIONS are made up in a pump house laboratory and poured into the tanks through the floor. Tomatoes and cucumbers are very popular crops.

JAPANESE GIRLS plant lettuce seeds in the hydroponic beds near Tokyo. Five cargo planes of vegetables are hauled from here to the troops in Korea daily.

SHOULD I RAISE BROILERS?



It takes this ten-pound pile of feed to raise this chick to market weight.

BY JANICE TURNER

IN THE FALL of 1949, Hobart Hall, who grows corn, soybeans, and wheat on his flat land, and shorthorns on the upland pastures of his 230-acre farm near Paoli, Indiana, set his two sons up in the broiler business. Broilers, he felt, were the answer to the old, old question, "How're you going to keep them down on the farm?" Profits from broilers might make the boys think twice before applying for a factory job in town.

With the machinery he has assembled—his farm is brilliant with the red, green, orange, and yellow of new machines—Hall's farm takes the time of a man and a half to run. The broiler project uses his sons' time and takes up the winter labor slack.

After a year and a half in the business, Hall can lean against the wheel of his tractor and say, "It's a wonderful project. Why, the last batch the boys sold only lost us fifty dollars!" Hobart Jr. and Charles, the teen age boys who run the project under the businesslike name of The Hall Brothers, can afford to laugh at their father's joke. Their carefully kept books show that even with the one recent failure their return is above the average profit made by the many farmers in the area.

News of the fat profits that have been made in the broiler business during the past few years is tempting many a farmer to convert an old barn or build a new building to house this high value crop that can be harvested four times a year. During the past 20 years we have increased our production of chicken meat by over a billion pounds a year and the industry is still growing.

There was a time when chicken every Sunday was the mark of the prosperous family or the high-class boarding house—the kind that called the boarders paying guests. Today, because of dollar-a-pound round steak, chicken is a strong competitor of hamburger. During the past year when beef prices rose 42 per cent, poultry prices went up 23 per cent. Chicken is no longer a holiday dish; it's an every-day meat staple in the home, and a standard item on every menu from the drive-in roadhouse to the five and dime store lunch counter.

Improved breeding and nutrition produced a market-sized bird weeks sooner and with pounds less feed than it took twenty years ago. One long-time poultryman figures that the improvement in breeding, feeding, and handling in the last twenty years has knocked 12 cents off the cost of growing a pound of broiler meat. Another 3 to 5 cents a pound has been lopped off the retail price by improved packing house methods in giant plants where 12,000 chickens an hour can be scalded and plucked, and a million pounds of chicken meat sent to market each week.

AUTOMATIC FEEDERS keep these 6,000 broilers eating. Thermostatically controlled hot air blowers keep the chicks warm.

Though the 616 million chickens raised each year come largely from producers who deal in hundreds of thousands of chickens, many a general farmer is looking over his farm to see if broilers fit into his picture. Some who have awkward-sized farms which don't take up the full time of the farm workers, or who have farms which are too small and need an extra source of income, or who have unused buildings which would serve for boiler raising, feel that broilers might pay a profit on their farms.

The questions that a farmer must ask about getting into this new business have to do with the amount of capital required, the availability of labor, the farm buildings already on the place which might be used, the water supply, and the markets for his broilers.

Investment

One of the first questions that must be answered is the cost of getting into the business. Figuring the cost of a brand new building and its equipment and the money it will take to put the first 5000 birds on the market, the price will come to a respectable $11,000. (Five thousand broilers to a batch, or 20,000 a year, incidentally, is used as a unit of measure in the industry. With the business geared to produce birds in large numbers and take a small profit on each, units of less than 5000 are not considered to be worth while.) The $11,000 includes almost everything: the capital investment in the building, heating system, and equipment, and production cost of the first batch of chicks, feed, medication and the like. Broken down, these figures show where the money goes:

Building	$5,000.00
Heating system (two gas heaters with blowers)	1,000.00
Equipment (feeders and waterers)	975.00
Chicks	950.00
Vaccinations	75.00
Feed and grit	2,750.00

THREE FLOORS OF BROILERS in the old hay mow and a fourth below enable this old barn to house 5,000 birds. Three top floors are shown on the opposite page. Women and children can do much of the work.

Fuel (year-round average)	75.00
Interest on investment	85.00
Fire insurance	30.00
Sanitation	30.00
Electricity	20.00
	$10,990.00

Taxes and labor, which would vary widely over the country, are not included; they must be added by the farmer at the rates he pays in his part of the country. Building costs, which *are* included, will also vary, but the above figure represents an industry standard of $1 per bird. Hobart Hall would laugh at such a figure—his very substantial, tile building, new early in 1950, cost $2.600, which is 40 cents a bird for the 6,000 birds it holds. He lives in an area of low building costs and, besides, he and his boys supplied a good half of the labor. Since then building costs have risen and, today, Hall figures that it would cost him $1,500 more to duplicate the building.

Another item, litter, was not listed since it may or may not be an expense. In many places farmers use straw from the farm or are able to get wood shavings for the cost of hauling. (Sawdust is not used since chicks mistake it for food.) Hall buys peanut hulls in 100-pound bales for $1.00 a bale, and finds that it takes 100 bales for each batch of 6,000 birds. Other types of litter are ground sugar cane stalks, which sell for around $2.65 per 100 lbs., and peat moss, which sells for $4.80 per 100 lbs. The peat moss, however, will cover more floor space than either cane or peanut hull litter.

Other of these cost figures will vary, of course. Feed, for example, seems to be higher every time the poultryman inquires about the price. The figure used was based on feed at $5.50 a hundred pounds. Chicks are listed at $19.00 a hundred, which is the price Hall and his neighbors are paying for the New Hampshires they raise. In some areas the broilermen can buy cockerels for $11.50 a hundred, but this is only where there is a demand for pullets of the general purpose breeds for egg laying. Leghorn cockerels can be had for as low as $3.50 a hundred, but most broilermen feel that even as a gift they would not be worth raising.

With feed prices what they are, the efficiency with which a bird turns feed into flesh becomes of prime importance. A leghorn which takes 16 weeks to grow to 3.07 pounds and consumes $.74 worth of feed doing it, cannot compete with a White Rock, Rhode Island Red, or New Hampshire which will grow to 3.25 pounds in 12 weeks on $.58 worth of feed. And these general purpose breeds may eventually be pushed out of the picture by more expensive, but more efficient cross bred and hybrid chicks.

If a farmer is currently so busy that he would have to hire extra labor for a broiler

(Continued on page 96)

LARGE DOORS permit the Hall brothers to drive into the house to clean up the 30 loads of manure produced by a batch of broilers.

CHICKS ARE INOCULATED for Newcastle disease at the hatchery. Respiratory illnesses are another major cause of disease loss.

HOW TO WIN A BLUE RIBBON

BY GRANT CANNON

DURING the last minutes of waiting, while the judges at the 1946 International Livestock Exposition were picking the champion carload lot of fat lambs, Henry Besuden overheard a woman spectator say flippantly, "I sure hope the Kentuckian wins. If he doesn't he's going to die, and he can't die because there isn't a coffin in Chicago big enough to hold him."

It is doubtful if Besuden, the Kentuckian who stands 6 feet 4 inches tall and weighs a good 215 pounds, would have died had he lost; he gets too big a kick out of living, out of farming and showing his sheep, out of building ponds and improving pastures, and out of raising his sons to be successful farmers. The question was never settled; his 50 lambs won the event, the first American sheep in 17 years to take the championship away from the Canadians. This was the first of four such championships which, along with small pen wins in fat lamb and breeding stock, have made Besuden the man to beat in the 1951 International.

Besuden is more than a show winner. He is a successful commercial sheep man. He has also made a success of the purebred sheep business, and above all he has been a success at rebuilding a worn out farm. He is so little given to pompous statements that it would be impossible to get him to give the *secret of his success*. He came close to announcing his formula for living when he said, "The way to get a real kick out of farming, or anything else for that matter, I guess, is to find your own special talent and then bear down on it and push yourself above the average. I was lucky. I found that I had some talent for doing the things I *had* to do. I *had* to improve the farm or starve to death; and I *had* to go into the sheep business because sheep were the only animals that could have lived off the farm."

Henry Besuden wins the International and makes money on his lambs; here's how he does it.

When he was 21, Besuden came into the inheritance that had been held in trust for him since the death of his father 20 years before. The inheritance was Vinewood, a decaying mansion set on 632 acres of rolling, hilly land on the eastern edge of the Blue Grass region, a farm that had been operated by a 20-year procession of tenants with no manager. When the land had grown too poor for tobacco, the fields had been plowed for corn as long as there was enough top soil left to cover the seed. Vinewood became a miniature replica of the western badlands.

The farm was so poor that the out-of-town bank which operated it as trustee not only refused to lend Besuden enough money on the place for him to finish one more year of college, but sued him and won a $4,500 judgment against the impoverished estate to pay for their management of the place. As soon as the basketball season was over in 1927 Besuden, who had been a star center, left the University of Kentucky to return to the farm—a move, he now admits, which was of small loss to the educational system of the State.

The farm has been in the Besuden family ever since Great-grandfather Henry Besuden, who made a fortune in leaf tobacco, bought it in 1878 for his oldest son John. The house, which is considered large even in central Kentucky where large houses are as common as southern accents at a cotillion, was built by Ben B. Groom, a shorthorn breeder in 1861. It is a monument to the fabulous shorthorn boom that brought a sort of personal inflation to a few breeders until the crash in 1878. During this boom period a calf was sold for $13,500 from the pens of Vinewood and a neighbor, Abram Renick, was trading single heifers for 500 acres of land. English breeders reversed the trend of generations and came to America to buy.

The plans for Vinewood were brought from England where Groom had seen such a manor house on one of his cattle-buying trips. The parlor is 45 feet long by 15 feet wide and has 13-foot ceilings and 10-foot doors. All of the rooms are elegantly finished with polished plank floors, carved woodwork, handsome fireplaces, and a servant's bell pull for each room. There are 19 rooms, not counting a secret room in the tower reached by a trap door and where Confederate arms were stored during the Civil War, or the Texas room, a room with an outside entrance where the family could put up strangers travelling through without inviting them into the household.

At the time it was built running water was brought into the house, into the cattle pens, and to a fountain in front by pumping it from a windmill a half mile away and storing it in a tank on top of the building, a system now replaced by pump and pressure tank. Besuden tried to heat the entire place one winter by using the original heating facilities, fireplaces. "I burned a 30-ton carload of coal before I gave up. After that we put in a furnace, used the den for a living room, and by shutting it off with the kitchen and three bedrooms from the rest of the house, each winter we get by with 15 tons of coal."

When young Henry Besuden stood in the drawing room of Vinewood the day he inherited it, he could look at the heavy velvet drapes and gilded mirrors and take dubious pleasure in the realization that he was probably the most elegant near-bankrupt in America. If he hadn't been so determined to make a go of the place he would have known that here was the perfect white elephant. The house that had been too big for any one family ever since the days of slavery had suffered during the time tenants ran the farm, but it was the land that concerned Besuden. The house could be repaired with a lot of work, the land would take generations of care to rebuild. He knew that any success he would make as a farmer depended on his healing the soil.

In the spring of 1927, he planted his corn crop on what was still called the bluegrass field—so named because there were some that could remember when there had been a meadow there. The corn grew waist high and wasn't worth harvesting. Since then practically the only row crop has been a few acres of tobacco.

His first big job was filling in gullies. This job lasted until 1950 when the last of the big scars on the rolling land were healed. Most of the thousands of gullies were filled by the simple device of plowing around and around the raw cut, each bite of the plow throwing the clay soil toward the center of the gully until the steep-sided trench had been made into a rolling depression. As the gullies were smoothed out they were planted to grass which has held them in place ever since. "If I had to do it over again," Besuden said, "I'd try and scrape up the money to hire a bulldozer, then I'd fill the gullies by pushing back the washed out soil at their mouths. This is the earth that once filled them and it's now covering the top soil of the flat land. The last couple of gullied fields we had I did that way; it's expensive but more satisfactory."

"Everybody in the world is willing to give advice to a young farmer," Besuden will tell you; "at least that's the way it seemed to me. The advice I followed was forced on me by conditions. If I wanted a farm I had to fill in the gullies. I had to get the land back to grass—the one crop this land is ideally suited for. And I had to turn to sheep because they were the only livestock that could bring a cash return on the land as it was."

The first pastures for his sheep were the bottom lands, the gully mouths. "We cut the briars to clear a little grass land on the bottoms, but left the briars on the slopes until we could get grass to hold them in place." Since then he has built up his pastures to provide feed for as long as grass can grow, and 200 tons of hay for the winter.

Fields of Balboa rye, used as a cover crop on the 18 acres of tobacco land and as a nurse crop on pasture land that is being renovated, is the first fresh pasture the sheep nibble on in the spring. Besuden doesn't pasture the rye heavily in the fall, in order to give it a chance to achieve vigorous growth and a good root system. After he takes the sheep off in the spring and shifts them to the early growing

THE COMMERCIAL LAMB is a cross between a western ewe and a Southdown ram, such as Uncle Jim shown on opposite page with Besuden. Cross-bred lambs, marked for meat production by their sires, won the first of Besuden's carload lot championships.

fescue and clover, he lets the rye grow for hay. "It isn't the best hay in the world but when you pay $40 for stuff that is just plain bulk, it's worth gathering."

In Spring the sheep are shifted to 65 acres of what Besuden calls his fescue pastures. Actually these fields are planted to a mixture of fescue, ladino, and timothy. Besuden feels that fescue is a useful crop that should be used with a legume to provide spring and late fall feed. This makes him a rare fellow in central Kentucky where farmers seem to be divided into those who feel that fescue is without peer among grasses and those that think fescue is a nasty word that shouldn't be spoken in mixed company. Besuden first felt that ladino was the perfect companion legume to be used with fescue. During the past couple of years he has been trying birdsfoot trefoil as a second legume. He swings off his horse three or four times a day to see how the pastures are doing. The trefoil, he finds, will send down its thick woody roots deep into the clay soil and will shoulder its way right into the crowns of fescue. He is hoping that with an occasional reseeding of timothy and ladino he may have a permanent pasture mixture here.

Fields of straight Korean lespedeza are pastured during drought and are cut for hay. These fields are let go to seed and then disced in with Balboa rye in the fall.

Twenty acres of land are in alfalfa to produce the best of the winter's feed. Much of the alfalfa is cured in the hay mow over the lambing barn where unheated air is blown through the partly cured alfalfa to produce green leafy hay. "Our drier system is just too small here," Besuden said. "We can handle only 35 tons this way and it is so much superior to the field cured hay I wish we could mow-dry the lot. Incidentally, we've developed sort of a neat trick here. During the summer we keep the Southdown rams we have for sale here in the barn. We've found that on hot days we can make the barn right comfortable by reversing the drier fan and opening some trap doors we cut into the main flue. The fan pulls out

TUBBED AND SCRUBBED, the reluctant ram is given a bath and polished for a show.

POND BUILDING (left) has helped stop gullying and provides water in every pasture. Stomach worms are detected (center) by checking for pale eyes with bloodless veining. A fat ram on its back (right), is unable to right itself. Without help it will soon die.

the hot air here in the barn and lowers the temperature several notches."

Having tangled with gullies once, it is not surprising that Besuden looks upon the plow with about as much tolerance as the WCTU holds for a pint of corn liquor. He does use it, however, on a new patch of 18 irregular, flat acres of tobacco land each year. In the fall the heavily fertilized land is put back into pasture as rapidly as possible, starting with a rye cover crop. Along with the tobacco land about one-sixth of the farm is given special treatment each year. Soil tests are made and the land is given the lime and fertilizer that the tests show are needed. This year 80 acres were treated at the rate of 400 pounds of 0-14-14 and two tons of lime to the acre.

With this land treatment the pastures support a thousand sheep and lambs and 62 grade cows and their calves. The cows are bred to an Angus bull and produce a sturdy 600-pound calf each year on milk and grass. "So far as I know, we invented the cow and calf plan," Besuden said. "In 1932 we bought a few scrubby grade cows to feed out on grass. I paid $30 apiece for them and sold them a year later for $30. We knew that we'd never get rich that way, but what gave us our new idea was that a couple of the cows had had calves and we got $30 for the calves. Since then we've been buying a more or less dairy type cow, breeding her to a good Angus bull, and selling the black beefy calves."

The big job at Vinewood now is to increase the carrying capacity of each acre. The improvement in 23 years has been phenomenal, but this Besuden treats rather lightly. "Any half-wit would have looked good at first. The place was so run down that no one could even detect your mistakes and any success we had was spectacular. The only thing I've got to be really proud about is that I changed a badly run-down place into a paying farm without any outside money and paid off the court judgment and a couple of mortgages in the process. But we've got a lot of room for improvement. Let me tell you what happened a couple of years ago.

"We had the Soil Conservation Service do a survey of this place for us. They came out and tested the soil and made a map showing all of the slopes and condition of the topsoil with colors showing which land was plowable, which was dangerous to plow, and which should never be plowed. Just before they brought the map and report out, the State supervisor stopped by the local office. He looked over the report and studied the map and said to the local man, 'If the person that owns this place is a friend of yours, I'd advise him to sell it while land is high and move to some place where he has a chance of making a living.' And that was after 23 years of hard work on the land!"

The beginnings in sheep were very modest. The farm had to have a source of cash income and sheep seemed to be the logical animal to produce it. Besuden bought a few native mutton type ewes and a Southdown ram the first year he started to farm. Five years later he bought his first registered Southdown ewes. His object at the time was to become self-sufficient as far as rams were concerned, but since then this purebred flock has grown to 100 ewes, a fourth of all the sheep on the place, and his surplus rams now bring in about half of the income from sheep.

The purebred Southdown, Besuden admits, takes a good deal of care to raise. Built like a packing box on short legs it is unable to right itself if it rolls onto its back and will die within a very short time if it isn't found and rolled over. The ewes have a harder time lambing than less highly bred sheep, and the lambs are a little harder to raise. Part of this trouble comes from the extremely compact body and tendency to fatten up that has been bred into the beast, and part from what Besuden calls the sentimental factor. "There's many an old ewe that has been kept far longer than was good for the flock because we remember that she won a couple of ribbons or that she produced some top lambs for us." Despite all this, Besuden feels that the Southdown is well worth every bit of effort and every extra penny that is spent on it. The Southdown ram, he is convinced, is the most prepotent sire in the business; one that can be crossed with practically any ewe and produce a mutton type lamb.

As with most livestock men, there comes that one animal that is outstanding beyond all others. With Besuden this great animal is a pug-faced, snuffling ram named Uncle Jim who strolls with impassive majesty around his own private paddock. If this yearling buck lives up to his early promise, Besuden is sure that he will make Southdown history. He was shown last year as a breeding lamb and won second prize at the International, which simply shows, as far as Besuden is concerned, how wrong a judge can be. (The winning lamb was shown by one of his toughest competitors, Harold Barber, the shepherd for the University of Kentucky. "A man I would have worked with in college—had I finished college and had I worked in college," Besuden says wryly.) Now Besuden is debating whether to show Uncle Jim again. "If I show him it means fattening him to a point where he won't be in breeding condition. I may try to keep him in a cool basement room during the day and let him out on pasture at night—that way I might be able to use him for breeding through September and still put enough fat on him to be able to finish him up in October and November. Some people, I know, would use this situation to prove that show standards are artificial, but I would disagree. You simply can't tell how a mutton type sheep will fatten out except by going through the process."

Shortly after his start in sheep he changed his commercial flock from native ewes to western ewes that were crossbred Hampshire-Rambouillets. With these sheep, which he buys as yearlings, he has built up his flock to 300 commercial ewes. He keeps the flock at this level with the purchase of 50 young head each year. In the fall he breeds his 300 ewes to 12 of his Southdown rams and in the spring they give birth to some 450 square-built, muggy little lambs that could almost pass for purebred Southdowns. Early in summer he sells his lambs on the Winchester mar-

(Continued on page 127)

CHAMPION HERDSMAN MEDALS (left) jingle on Bev Besuden's wrist as she hangs a plaque. Orphan lambs (center) are nursed by a milk goat at lambing barn. Three Besudens (right) Henry, Carlisle, and David, show off their favorite livestock.

LINDA

BY ALBERTA SMALL STRAUSS

IN HER new starched dress Linda goes to Sunday School and sings, "Jesus Loves Me" in unconditional faith and innocence. Scrubbed and be-ribboned, she looks like her great grandmother, who sang the same song some four score years ago.

"Jesus loves me, this I know,
For the Bible tells me so:
Little ones to Him belong,
They are weak, but He is strong."

All week she has mothered her dolls and barnyard pets, but on Sunday she helps her mother in the thankless task of rounding up her unscrubbed, unbrushed brothers for the weekly hour of worship. This feminine collusion is well known to all good and God-fearing men of the soil, and they are its slaves from the cradle to the grave.

Linda instinctively likes best her "Sunday-go-to-meetin'" dress. Instinctively, too, she knows that boys, big and little, cannot be persuaded to bathe or sing sweet hymns in itchy suits in Sunday School, except perhaps by force. So, to atone to the gentle Lord Jesus for such Sabbath pursuits as fishing and swimming and trapping skunks, she knows some woman must take a hand all the way. She knows, for she's a little girl.

When it is her turn to choose the first prayer in Sunday School, she closes her eyes tightly and repeats the words almost with excitement, for they are dear to her and within her understanding.

"Loving Jesus, meek and mild,
Look upon a little child!
Make me gentle as Thou art,
Come and live within my heart.
Take my childish hand in Thine,
Guide these little feet of mine."

Unlike the grown-ups, who favor variety, she prefers her favorite hymns and favorite prayers over and over again. She never tires of them: they are the same hymns and prayers that have found a way to the hearts of generation after generation of children. She sings happily of a sunbeam.

"Jesus wants me for a sunbeam
To shine for Him each day.
In every way try to help Him
At home, at school, at play."

By the time the second hymn is sung she is indeed an anxious sunbeam, for she can now make her weekly offering. Opening her stylish, plastic handbag, complete with zipper, she extracts from its change purse one shiny penny. This operation may be repeated several times before the collection basket actually receives her weekly wealth. Donating from a pretty pocketbook is not to be taken lightly nor without some flourish by a female, even of primary age. Also to give is good and sweet. She knows the feeling and she is grateful.

"Thank you for the world so sweet,
Thank you for the food we eat,
Thank you for the birds that sing,
Thank you, God, for everything."

And finally it gets to be story time! She sits entranced, especially if the tale is taken from the Old Testament. She has read many books written for little girls, but they are pale fiction compared to the great and redblooded drama of the ancient Jews.

Only during the lesson period, which follows, does she squirm a bit. Although she knows her lesson letter perfect, sitting still, by now, is all but impossible. She tries. Her eyes wander up and down the line of little girls sitting around her. They are her friends. She notices their hats, and shoes and purses and dresses. And she has thoughts. She knows which little boy she likes the most and stares admiringly at him. Even from that moment his chances of escaping her may be negligible, but he is unaware as only the young male can be. Toward the end of the lesson the squirming becomes perpetual motion; but the teacher understands, and besides there are only the closing prayers before the hour is over.

"Lord, teach a little child to pray,
And oh, accept my prayer:
Thou canst hear all the words I say,
For Thou art everywhere.
Amen."

So once again she asks help in learning the next prayer, a very long prayer for her. It is the Lord's Prayer! Without knowing what the words mean, she loves its beautiful sound and rhythm. The difference between her simple prayers for children and the great, spiritual poetry of the Lord's Prayer bothers her not. They are judged alike in her heart.

"Our Father which art in heaven,
Hallowed be Thy name.
Thy kingdom come.
Thy will be done in earth, as it is in heaven.
Give us this day our daily bread.
And forgive us our debts, as we forgive our debtors.
And lead us not into temptation, but deliver us from evil:
For Thine is the kingdom, and power, and the glory, forever.
Amen."

With printed lesson in hand and a colored picture tucked neatly into her purse, everywhere on Sunday in rural America, some little girl goes home from Sunday School. Sometimes she walks, sometimes she rides, past fenced-in fields, past neighbors barns and sheds, past barking dogs, past lanes with empty mail boxes, perched on heavy posts that stand in dusty grass, past everything she knows and is. She views her world with eyes peculiarly American. The land is the same as her great-grandfathers knew it when they broke the silence of the wilderness many, many years ago.

At home, she changes from her pretty dress to blue jeans and a shirt. Her chores on Sunday are the same as Monday, for her barnyard friends are not inclined to fast upon the Sabbath. When they are fed and quiet, she once again helps her mother, this time in the kitchen. After she has sampled everything and the dinner is on the table, she is allowed to ring the dinner bell. The task of rounding up her brothers is now an easy one. She knows the lure of drumsticks and apple pie to a little boy. She knows all this, for she's a little girl, and for all this, and her new dress and just for the joy of being alive she is thankful.

"God is great and God is good,
And we thank Him for our food;
By His hand we must be fed,
Give us, Lord, our daily bread.
Amen."

WHEN the citrus industry started to run oranges, grapefruit and tangerines through the giant juicers and ship the tangy liquids about the country in cans, it immediately created a thorn in its own side. Since only about one-third of a citrus fruit is juice the other two-thirds, a pulp composed of peel, rag (the interior solids) and seeds, had to be disposed of. The processors solved this by hauling the pulp out in the country and dumping it into streams and on waste land. This plan, however, struck the Florida State Health Department as too casual. The authorities instructed the processors to get out the digging machinery and bury the waste.

Digging the big holes and afterwards covering them with earth gnawed away at the profits derived from separating the fruit from its juices. The processors were unhappy.

Then they started looking around the premises. They studied the cattle that wandered in from surrounding unfenced range and stood along the edges of the huge pulp piles munching happily. And during the canning season the citrus eating stock fattened and their hides grew more pliable and glossy. In Florida, wet pulp is fed near the citrus plants and since there is a shortage there of both grain and good grass, the animals eat pulp or else. When they get hungry they soon learn to eat it. The plant owners also took a new interest in the enterprising farmers who drove to their farms, for the plant owners had long been glad to have farmers take the darned stuff and get it out of the way.

If cows loved the citrus pulp so much, and their owners were willing to spend time and money hauling it away, wasn't there a chance that the pulp could be turned into feed, a profitable by-product?

It was in 1932 that a citrus juice company constructed the first commercial pulp drying plant and established the pattern for a new by-product industry. Tourists no longer see the huge piles of citrus pulp outside the juice plants. The pulp has been taken inside, dried, pressed, and turned into a popular livestock feed in such quantities that citrus pulp feeds have become a six to seven million dollar business. The industry centers in Florida, but there are small quantities produced in both California and Texas.

Cattle feeders, especially in the Midwest, who have grown up with the idea that corn is the basic feed are understandably reluctant to take up anything new like citrus pulp. This is a relatively new industry which has spread through the north only within the last few years. There is a great deal of inertia to overcome in addition to an educational program to teach how citrus pulp is fed. When corn is cheap or when a farmer has plenty of good silage and alfalfa hay, there may be no place in his feeding program for citrus pulp. But in those areas where corn is high and must be shipped in, as for instance in New England, it can compete most favorably with grain.

Dried citrus pulp is a coarse, bulky feed that is shipped in large 100 pound bags. It has a dull brownish color much like that of a commercial dairy supplement. It has only a slight citrus odor and tastes bitter to the human tongue.

Florida's 20 citrus pulp plants are expected to produce this year about 150 thousand tons of feed. The country produces an annual 30 million, 90 pound boxes of citrus fruit for juices, and 60 of the 90 pounds in each crate finds its way into cow feed instead of the juice can.

A growing number of dairy men both in and out of the South are feeding the citrus pulp feeds. About half of the pulp produced in Florida is shipped out of the state, and the percentage is growing. Much of this is shipped to dairymen in the New York milkshed, but shipments also go to farmers in every state east of the Mississippi.

Walter Hurlburt, Ashley Falls, Mass., is one of the many New England farmers feeding citrus pulp. He doesn't feed by the book, but gets results anyhow. To him citrus pulp is a substitute for *both* grain and protein, but he adds a special word of caution.

"We started feeding citrus pulp two years ago at Hurlwood Holstein Farm to stretch our roughage when we were overstocked on cattle. For this purpose, we have fed up to 10 lbs. per day with good results.

"Daily production is holding steady at 1700 lbs. of milk from 36 cows. Besides good pasture and a little hay, we feed 200 lbs. of citrus pulp and no grain to most of the herd and some of the cows are milking close to 80 lbs. With this feeding and production the herd is in good flesh and the last test by the state mastitis laboratory showed the entire milking herd classed as No. 1 cows.

"However, our case may be special because we have top quality pasture, such as ladino clover and brome grass: fresh. young and well fertilized or small grains about 8 inches high. Our silos were filled June 2 with our entire first cutting, before timothy heads showed, blue grass just heading, etc. Without that, my feeding program wouldn't be worth a nickel.

California dairymen have learned to feed it too, because of shortages in their regular feeds. Says Mr. J. M. Rosenberger of Adohr Farms, Los Angeles:

"For several years we have included orange pulp in our dairy concentrate ration and find it a very satisfactory feed.

(Continued on page 84)

DRIED CITRUS PULP (above) is flaky, brown, and crunchy. The orange slice was added by the photographer for comparison. In the citrus pulp plants in Florida, Texas, and California, the dried pulp is automatically sacked in 100-pound bags (right), for nationwide distribution.

Here is Mother Nature's memorial to man's neglect. Farmers are rapidly organizing to halt soil erosion.

CONSERVATION DISTRICT

DEEP in the Allegheny mountains, bordered on the south by the state of Maryland and bisected in the north by the famous turnpike, is Fulton County, Pennsylvania, where water is both the friend and the enemy of man. Here on the steep slopes and in the rolling coves between the mountains, water still runs wild—except on an increasing number of farms where the farmers have decided to slow this water down and make it their servant instead of their master.

Fulton county farmers are deciding that perhaps water is not man's enemy after all; that man himself is the enemy when he doesn't control the runoff by the way he uses his land. Fulton County farmers organized their own county wide soil conservation district in 1945 to find a way to make a better living on their soil.

As Bill Swope, down near the village of Needmore says, "Ten years ago there didn't seem to be any life in the soil. Today it feels different. Humus does that —makes it feel alive."

It's Nationwide

What is happening in Fulton County Pennsylvania is happening all across the country. Fulton County's conservation district is one of some 2,350 organized in every state in the nation.

During 1950, 121 new districts in the country brought a total of a billion and a quarter acres within organized conservation districts. Not every farmer in these districts is going along with the trend, of course, but on about 950,000 farms in these districts farmers have agreed to follow conservation plans.

They see in contours, strip cropping, good rotations and other conservation practices the chance to bring their farms back to virgin fertility.

The nationwide plan for soil conservation districts had its birth in the late thirties. Since then it has become a monument to Dr. Hugh H. Bennett.

In the thirties soil conservation work was linked closely with the old Civilian Conservation Corps which supplied manpower to plant trees, heal gullies, and alter stream beds.

But out on the farms where work was being done there arose increasing sentiment that the farmer should have full say about soil conservation practice on his land. This pressure was felt in Washington, and Soil Conservation Service men saw the wisdom in it. They worked out a bill from which the states patterned their own required legislation.

While the new Soil Conservation Ser-

vice met little opposition from farmers, it met a great deal from older government agencies which saw in the young SCS an organization to rob them of some of their prestige. There is still tension between the SCS, the Production Marketing Administration, and the Agricultural Extension Service in many counties. In some places the county officials of these three services still aren't on speaking terms. A plan is now under way to make these government organizations into closer working units. Under a plan being put to work for the first time this year, the county offices of the various agencies will be housed in the same building. There is hope now that the farmer, long confused by being shuttled from one office to the other in his county seat, can soon go to one building where the services due him under all of these agricultural organizations will be coordinated.

How A District Starts

The way a conservation district is born varies from state to state, but in Pennsylvania it goes something like this:

The county extension agent, or the district soil conservationist, or a conservation minded pioneering farmer, starts talking with the leading farmers in the county about the advantages of an organized district. The idea spreads. A group of farmers get together with the county commissioners, set up an organization, and elect a board of directors and officers for the district.

Some districts have a membership fee of from one to five dollars which members pay as they make application for farm plans. This money goes for such things as stationery for the district, and refreshments for the occasional meetings which it holds.

The Soil Conservation Servicemen, two or three to a district, often have more work than they can get done. To speed up their work they are beginning to develop a new neighborhood approach that enables them to reach more people in the course of a day. If a teacher tried to teach each of his students individually he would never get done. Now soil conservation service workers are working with neighborhood groups of farmers to speed their work.

The groups are usually small, about six farmers and their wives. They meet in the farm homes for a series of meetings. The soil conservationist meets with them and tells them how they can contour, terrace, build ponds and rotate their crops. The group generally includes only farmers who get along well together, those who would help each other in a tight spot, and there is usually a natural leader among them to keep the organization moving toward its goal of better land use.

The Soil Conservation Service charges nothing for its farm planning and guidance. The farmer gets this land management service free but spends his own cash for the labor and equipment, fertilizer, lime, and seed he must buy. And he can even get part of this money back, by applying to the Production Marketing Administration (the old AAA) in his county.

The PMA makes partial repayments to farmers on the costs of certain land improvements. The amounts they will pay vary from state to state according to regulations which come out of Washington. Washington also informs each county at the beginning of the year how much Federal money it can distribute to farmers during the year. There are critics who say that the amount varies according to the political necessities of the year. The SCS points out that some parts of the country are in greater need of help than others. One typical midwestern county had an allowance last year of $6000 which was proportioned among all farmers applying. Farmers in this county applied for reimbursement for contouring, terracing, liming, and other soil improvement practices they had completed for the year. They sent their applications to PMA. PMA officials checked the figures with the SCS men, since each claim must be approved. Those claims from farmers who were not soil conservation district cooperators were checked on the farms.

There are 20 farming practices for which a Pennsylvania farmer can receive payments. For example, in 1951 he could get a dollar an acre back for every acre of cultivated crops planted on the contour, and 50c an acre if the crops, such as wheat and soybeans, were drilled. For contour strip cropping he was paid two dollars an acre, and for spreading lime he was paid about $1.50 per ton. The payments for liming, unlike the other payments, vary from area to area because of differences in transportation costs and the type of lime available.

Back To Fulton County

Walter Palmer, who has had his Fulton County farm under a complete conservation plan for 11 years, still does a lot of worrying but about the other farmers, not himself. His farm is in good shape and he knows it, but there are other farmers in the neighborhood who are still farming square fields and planting their corn up and down hill and this concerns Palmer, for erosion control is truly effective only when all farmers in a watershed practice it. It has concerned Palmer so much in recent years that he has gone out as a one man missionary force to sign these reluctant farmers into the Soil Conservation District. The Soil Conservation Service men in McConnelsburg, the county seat, aren't sure any more how many farmers Palmer has brought into the fold. "Maybe 60 or 70," they say, and he is still working.

"It's for their own good," Palmer says. "I just want them to get the advantages from soil conservation practices that I got. If I had to go back to my old square fields I guess I would quit farming. My yields are up and my soil is getting better every year. When we get all the farms along our creeks signed up the creeks won't be full of muddy water any more, and my neighbors won't dump their flood water on me."

Palmer's farm of 187 acres has 87 acres of timber land, for there are slopes on Fulton County farms too steep for anything but timber. Palmer is gradually switching to more and more grass crops and fewer row crops; thinks grass is better for his soil. In addition he is growing more corn on fewer acres. He has seen his corn yield climb from around 40 bushels to the

EARL TRAUX, by cooperating with District Conservationist Andy Warner (holding map), has employed contouring, grass, fertilizer and common sense to bring his hillside Fulton County Pennsylvania farm from gullies to high fertility in 11 years.

TERRACES PROTECT the top soil by guiding water around the slopes. Terraces can be made with tractor and disk or plow. A Soil Conservation service man stakes contour lines, helps plow first furrow.

THIS FIELD, water worn and wrinkled, was carelessly farmed and top soil crossed the line fences. There is still hope for it if the owner will contour, strip crop, use grass waterways and long rotations.

BY WRAPPING HIS crops around the hill in long narrow ribbons the owner of the field below works on the level, has longer rows and less turning, and most important, keeps top soil in place.

acre to nearly 80, and there is no indication yet that yields have stopped increasing.

"My farm's a little bit hilly," says Palmer, and to an Illinois farmer this would be a masterful understatement, "but with strip farming I don't waste too much soil. Sure, in a heavy downpour some of the soil washes off the corn strips, but the next sod strip below catches it again and keeps it out of the creek. And another big reason I'd sooner farm the strips is because I'm working on the level and it takes less power."

Palmer has no doubts about the virtue of his cause when he sets out to do a job of missionary work in contouring. "Everyone I ever signed up is satisfied," he says. "The rest are just losing out." Palmer says of those who haven't climbed aboard the conservation band wagon. "They have a mind of their own," Palmer says. "Guess some of them are afraid that they'll be told what to do."

But the farmer who signs up with a soil conservation district can do as he pleases as long as he pleases. He has to take no man's advice, but the help is there for him when he feels he needs it.

Stop and talk, for instance, with Earl Traux, who farms some mighty steep land along the Snipe's Mill Road in the south-central part of the county.

Traux, a pint-sized, hard working farmer who has farmed his 157 acres for 23 years, has brought considerable fame to Fulton County's soil conservation program. The Baltimore and Ohio Railroad has an annual award for the Pennsylvania farmer who does the best job of conservation for the year. In 1950 the award, a fifty dollar war bond, went to Earl Traux.

He traces his interest in conservation matters back to the winter of 1939-40, and an evening class for farmers at nearby Warfardsburg High School. There were 60 Warfardsburg farmers in the class conducted by the vocational agricultural instructor. They visited outlying farms where they saw conservation practices already in operation. What Traux saw made good sense: he had visions of his own steep hillsides strip contoured instead of farmed square. He did more than think about the new plan: he asked Soil Conservation Service specialists to help him turn his place into a demonstration farm. And today you need only drive down Snipe's Mill Road to see that the Traux farm is a mighty fine show piece.

One spring day he went over his farm in detail with a soil conservation field man and they made a map of each field and determined how the field should be used. This map was a guide to Traux for all the conservation jobs he should do on his farm during the following years.

Most conservation farm plans do not involve a complete soil test in the beginning. The soils technicians claim that they can tell from the soil types on a farm how much fertilizer it should have and how much lime it should get to start with. Usually it is as much as the farmer can afford to buy. When he gets his soil back into good production the soils men suggest that he take soil samples and get them tested to find what the soil lacks so he can go from good production to better production. On most hillside soils even a test for pH isn't essential. Soils men say they can tell by the crops growing on the field roughly how much lime it should have. In fertile prairie soils, however, where production is already above the national average, a farmer should start his conservation program with a soil test.

And the soil conservation service will tell him how to sample the soil and send it to a laboratory for testing. Usually the laboratory is on the campus of the state college of agriculture. A few progressive states have county or district laboratories where regional farmers get their soil tested. The costs range from a dollar to five dollars generally for complete soils test for the major elements. A few states will test for some of the minor elements for an extra dollar.

During his first four years of conservation farming Traux contoured and strip cropped. He moved fences and combined fields to make longer rows around the slopes. He built a farm pond, and built waterways. All this slowed down the erosion of top soil, and it was high time, for already half of his original top soil had moved off the farm.

As Traux went about his revamping, Andy Warner, the District Conservationist from the Soil Conservation Service, came to his farm and helped him get started. By the time he had his new program in operation Traux had switched the emphasis from poultry to beef cattle, for he was producing lush new grass and legume crops and beef cattle could turn these crops into cash. Today he keeps two dairy cattle and 25 beef cattle.

His 71 acres of woodlot are managed on a sustained yield basis, which means only the ripe trees are cut and the smaller ones left until they can be harvested profitably. No animal grazes the woods, for grazing can ruin a woods. Traux has bought a sawmill, a small one to saw timber for his new cattle shed and hay storage building. He's going to build another silo which he will fill with surplus grass. He has increased his use of lime and fertilizer since he started farming on the curve. "And when I had square fields," he says, "the lime and fertilizer just washed down the hillsides and I didn't get much good from it. Now it stays where I put it."

And while Earl Traux was making the switch to conservation farming, his neighbors looked over the fence and cautiously appraised the improvement in his crops and stock. Soon there was considerable talk about organizing the county into a soil conservation district.

Then in 1945 the Pennsylvania legislature passed a law which enabled the coun-

STEEL WATERING TROUGH FORMS, rented from his conservation district, solved the stock water problem for this West Virginia farmer. With his own concrete mixer and the help of soil conservation service field men he built the trough for $25.

ties in the state to organize conservation districts, and Fulton County, already stirred by the idea, was the second one in the state to organize.

Once the district was organized and the farmers were ready to go to work, the Department of Agriculture's Soil Conservation Service opened an office in the county seat and staffed it with three technicians to help the farmers make plans and get them into operation. Howard Hannegan, who has been with the Soil Conservation Service for 15 years, heads the staff. His aids, Floyd Graham, and Lyle Putt, are graduate foresters with a good knowledge of soils and a working knowledge of engineering. Over these men is Andy Warner, who supervises three districts. He has his office in an adjoining county.

A farmer in Fulton County who wants to join up notifies one of the five members of the board of directors for the district. He is asked to fill out a form describing his soil troubles.

At the next bi-weekly meeting of the directors in the county seat, the application is approved. As soon as the farm comes to the top of the county list the technicians from the county office go out to the farm and the work starts.

Fulton County is land in bad need of conservation. From north to south one mountain range after the other runs the length of the county. Between the mountains are the coves. the most fertile soil in the county. From Sliding Hill on the west of the county to Cove Mountain on the east, little of the land is level and the most fertile soil there would not excite a Midwest farmer. And the poor soil of Fulton County is reflected in the economy.

Fulton County makes its living mostly from farming. The timber industry is big because roughly 85 per cent of the county is forested. Much of the agricultural land is only good enough to support subsistence farming. As you ascend the mountain slopes, fields and buildings get smaller and smaller. Some of the farmers work part time in a nearby army ordinance base or on the county roads to fill out their incomes.

In all of Fulton County there is no railroad. Until two years ago there wasn't even a county agent, but the farmers around the county enjoyed pointing out that neither was there a poor house. People in the neighboring counties had a different idea of this—they said Fulton County was too poor to build a poor house. There is one theater in the county, in the county seat, population 1,200. The next largest town is only one third as large.

But the Fulton County farmer likes his county, and he likes the life there. It is this loyalty that has turned him toward conservation practices in the search for a better living from his poor land.

Of the 1225 farms in Fulton County, 310 farmers have, like Swope, applied for complete farm conservation plans. Of these, 274 are already in operation and the others will be started as soon as the conservationists in the county office can get to them. A farmer who applies today in Fulton County for a farm plan waits less than a month to get started. In other parts of the country this might seem like a short wait. In one Ohio county, for instance, the district conservationist reports that they have so many applications that it will be two years before his small staff can get to all the farms.

(Continued on page 92)

THE HESSIAN FLY

When the Hessian soldier invaded America, he brought another invader in his straw mattress to worry the embattled farmers.

ONE hundred and sixty years ago the embattled farmers of New York had not only whipped the Hessian soldiers in the service of King George, but they also knew how to beat the Hessian fly, which they were sure was in the service of the Devil. They knew all about planting their wheat after the fly had deposited its eggs in the fall; they knew that some varieties of wheat were more resistant to the fly than others; they knew that the fly would attack barley; and they believed that they had found a bearded wheat that was immune. In addition to these sound, scientific facts they mixed in a superstition or two. They brushed the new wheat with elder branches or steeped the seed in a witches broth of herbs that was supposed to do the fly in.

They even thought, for a happy year or two, that they had completely conquered the fly. They were wrong. In 1791 the fly came back, apparently out of nowhere, and destroyed their crops.

Fifty years later there were a half dozen varieties of wheat that were known to be more or less resistant to the fly, approximate fly free dates were known for many parts of the country, and stubble plowing was recommended and practiced; but by this time the farmers of America were completely fly-wise; they knew they had a long hard fight on their hands. Today we are using the same general methods of attacking the fly which were in practice in 1790—our major advantage is our ability to communicate information and recommendations on current conditions rapidly to the men who can use the advice.

One thing we *do know* today is that we still have a lot to learn about the fly. W. B. Cartwright, the Department of Agriculture entomologist who coordinates all of the work on the fly, has said, "We don't really know how the maggot of the fly eats. No one can say for sure whether it rasps the plant, chews on it, sucks it, or punctures it. We are not sure what it is that makes it possible for the insect to thrive on one variety of wheat and die on another." Cartwright, himself, has worked on expanding our knowledge of the fly. Years ago he studied the time of emergence of the fly and its breeding habits, a project that involved nightly vigils in the wheat fields counting and identifying the flies as they emerged from their pupal cases during the night, observing the mating in the early morning hours, and watching the female flies lay their hundreds of eggs on the young wheat.

The Hessian fly came to this country in the momentous year of 1776. General Sir William Howe, the British commander in New York, received that year about 24,000 reinforcements from Europe. Among these troops were two brigades of Hessians, under General De Heister, who were sent to a camp at Flatbush. These men, it is believed, had padded their mattress sacks with fresh straw from the wheat fields of their native Hesse Cassel for the long sea voyage to America. This may not have been the way the fly reached America, but the New York farmers were only too happy to blame the hated Hessians. They promptly named the pest the Hessian Fly. We do know that the fly was never seen in America before 1776, and it was a serious threat to the wheat growers of Long Island two years after the Hessians arrived. By 1788 a Pennsylvania farmer wrote, "Near seed time last year, many persons on the Pennsylvania shore saw the insects so thick in the air as to appear like a cloud, coming over the Delaware river."

The fly was carefully described in 1792 by Jonathan N. Havens, a New York farmer writing for the Society of Agriculture of New York, who wrote, "It very much resembles the moschetto [SIC], except that it is much smaller and has a short bill. I never could discover that it preyed upon the wheat (at this stage of its life cycle—ed.), and very probably it requires no other nourishment than what it may obtain from dew or moisture. It is of a texture so delicate, as to be injured or destroyed by the slightest accident. Soon after it becomes a fly, it again lays the maggot on the wheat sown in the fall; and if this is not up at the particular time the fly requires it, the maggot must be in great measure lost, and the species reduced to a small number."

The fly has changed not at all since then. It still emerges from its protective case as

THE FEMALE FLY, laying her eggs on the wheat which the larvae will later use for food, is shown greatly enlarged. Life size, she is one-tenth of an inch long.

PLANTED TOO EARLY, this field of wheat has been devastated by the fly. Roots may start new tillers in the spring, but the spring flies will keep them company.

a fly in the fall and lays its eggs on the leaves of the growing wheat. Three to nine days later the egg hatches out and the maggot or larva makes its way down the leaf to the tender, juicy joint between leaf and stalk. Here the larva does its damage. It feeds on the sap and sucks up the nourishment that should have gone to the plant. As winter approaches the maggot's outer skin hardens and darkens and it goes into what, from earliest times, has been called the flax seed stage. Looking for all the world like a tiny flax seed, the white larva in its shiny reddish-brown protective case goes through the winter attached to the wheat straw. The warm spring days bring about a metamorphosis in the pest which now changes from larva to fly. The fly lives but a day or two, during which time it starts the cycle all over again by laying its eggs on the leaves of the new wheat.

When the moisture in the ground, the rainfall, and the temperature of the days and nights are ideal for wheat growing, they are also, unfortunately, perfect for the Hessian fly. In years that are favorable to the fly there may be three to five generations produced, but usually there are only two. The fall brood attacks the new wheat, often damaging the plants to the extent that only those plants with the vitality to send up new tillers survive. The larva will kill many plants outright. Some of the leaves will take on a deep green color like the deceptively healthy flush that humans get with a fever. The leaf blades of the infected plant remain short and heavy and tend to stand in an upright position. When the infestation is heavy as many as 90 per cent of such leaves will eventually lose their hectic green color and die. Plants that survive to grow again in spring will undergo further attack by the spring brood. The plants that grow to maturity will carry the scars of the attack; their seed heads will be sparsely filled and there will be a weakening indentation on the stalk where the larva lay. Wind or rain or even the weight of their meager grain will tend to break down the stem at this pinched-in spot.

Crush, Burn, Trap, and Hex

The attacks of the early farmers upon the Hessian fly were fierce and ingenious. They tried everything from smashing the worm to killing it with kindness. Even the battles over which was the best method of attack were bitter.

Those who were inclined to believe in magic proposed a series of preventives that lacked only an incantation to qualify as evidence for a witch burning. Chief weapon of the magicians was to cut young elder bushes and pass them over the new wheat. The smell of elder was supposed to cause the sensitive maggots to sicken and die. Others of this school started even earlier by steeping the wheat seed in a broth of elder juices. This practice of seed treating was carried on even after the English had lifted their embargo on American wheat after determining that the fly did not attack the grain and was never transported with it. Along this same line were the proposals to sprinkle the crop lightly with salt or ashes —a practice that seemed to have done nothing more than add zip to the diet of the larva.

Along with these superstitious practices, a determined effort was being made to conquer the fly through scientific investigation. In 1792 a committee composed of Thomas Jefferson, B. Smith Barton, James Hutchinson, and Casper Wistar was appointed by the American Philosophical Society to study the Hessian fly. Individuals such as Jonathan Havens, the New York farmer, were also carrying on investigations of the fly to find the best method of attacking it. One school of thought suggested carrying the battle to the fly itself and physically destroying it. The most direct attack recommended by the strategists of this persuasion was to pull a heavy roller over the young wheat in order to crush the eggs or larva. It was believed that the leaves of the plant would be bent downward and that those larva that survived the crushing would tend to wriggle down and off the tip end of the leaf instead of marching down into the sheath where the damage is done. Firming the seedbed may have been of some value, but the rolling

(Continued on page 119)

THE EGGS (top) will hatch in a day or two and the grubs will crawl to where leaf joins stem; there they will feed and mature. The fly population is checked annually (second) by counting the fly pupa found on plants. In the pupa stage the outer skin hardens to form a protective capsule, called a flaxseed, because of its shape, size and color. In this stage, the flaxseed can be found under the leaf near the root (third and fourth).

In the Greenbrier Valley of West Virginia, where grass farming is two centuries old, there is fine stock, fertile soil, and a high standard of living.

GREEN GRASS OF GREENBRIER

JIM BOWEN was one of the thriftiest people in the Greenbrier Valley, or perhaps in all of West Virginia. He had some farm land, about 300 acres of timber, and nine daughters. When he built his new three-story brick house with home-fired bricks in 1812, and it still stands, he divided it in half. He lived in half of the second floor and the daughters in the other half. Both sides had individual stairways that connected them with the outdoors. But the girls still had trouble going in and out freely.

Bowen took care of this by building his room so both stairways opened into it. The girls couldn't leave their quarters after dark without passing through their father's room, and that pleased him more than it pleased the girls. But Bowen, for all his elaborate precautions, lost the struggle.

In the course of time nine young Greenbrier farmers took part in a series of elopements that drained the Bowen mansion of its beautiful daughters, for Greenbrier Valley farmers were resourceful then as they are today.

The valley in which Bowen settled and where his descendants still farm is blessed with a climate and soil that are fine for growing grass crops. In the Greenbrier Valley grass is a tradition. There farmers who have considered grass a major crop for two centuries are about 200 years ahead of their time. And they have kept up with the times; they were among the first to renovate pastures and they didn't need prodding to take up better seeding mixtures, lime, and fertilizer. And the same is true in the feedlot where they are among the leading exponents of grass silage.

The farmer who wants to know what long-time grass farming can do for his land, his livestock and his standard of living can find much of the answer in a visit to the Greenbrier Valley which includes Pocahontas, Monroe and Greenbrier counties.

ROSS TUCKWILLER (left) raises beef cattle and sheep on a farm that has been in his family four generations. On the 150 acres farmed by Handley Skaggs (right) four families make their living. Skaggs grows only pasture and meadow crops.

When the first settlers pushed the Indians to the sides of the trail and moved westward over the mountains, they found the valley of the Greenbrier River with an average elevation of 2,000 feet above sea level and an annual 40 inch rainfall. And they found that when they cleared the forests the hills soon grew green with dark, healthy bluegrass and wild white clover, still the major pasture crops in the valley.

And because grass grew so thick and dark the Greenbrier Valley and Lewisburg, the pleasant colonial county seat of Greenbrier county, rapidly became a center of fine stock farms. There were at one time four race tracks in Greenbrier county, for the area was famous for its race horses. To this day they speak of Traveler, the favorite mount of General Robert E. Lee, as a son of the valley. Horses are no longer important or prominent in the agriculture of this mountain section for they have been replaced by

BY EARLY JUNE Handley Skaggs ensiles the season's first mixed orchard grass and ladino. His 50-cow herd no longer gets corn silage.

beef, dairy cattle and sheep. The state fair with one of the best cattle shows in the East is held in Greenbrier county.

Last spring at the County Cooperative Beef Sale 36 head of purebred stock, mostly bulls, were sold at an average of $453. On the Jersey City market grass fed Greenbrier steers have long ranked as high as grain fed steers from other sections.

What Makes the Grass So Green?

Whenever they go around the county today Ben Wamsley, the agricultural extension agent, and E. V. Wickline, the Work Unit Conservationist, preach the virtues of grass. They can readily see that the most prosperous farmers in the valley are those who have done the best jobs with grass. "All these limestone soils need to grow good pastures," Wickline says, "are lime, fertilizer, and clipping twice a year." Lime must be added because the limestone in the soil doesn't break down fast enough to keep the soil alkaline.

The limestone beneath Greenbrier county is laced with caverns and caves and underground streams. Creeks often go through the steep green hillsides instead of around them, and nearly every farm has its "sink holes" where runoff collects and slips into the ground before it can be put to use.

The limestone soils also help account for the hundreds of springs. Some of these springs offer mineral waters which have attracted visitors and settlers to the area since pre-historic times. One of these springs, the White Sulphur, is the focal point of the famous Hotel Greenbrier, on the eastern side of the county.

While the underground caverns present an interesting challenge to occasional cave explorers, they present a far different problem to the Greenbrier farmer. They soak up the surface water and as he increases the carrying capacity of his pastures and meadows his stock watering problem becomes more acute.

Let's take a closeup look at three outstanding Greenbrier grass farms. There is Handley Skaggs, a dairyman who has learned how to make fine grass silage, Ross Tuckwiller who raises a beef-sheep combination on his old family farm, and Taylor Campbell, a beef cattle farmer and a recent grass convert, who already has some excellent reasons for sticking to grass.

Handley Skaggs, a tall, soft-spoken dairy farmer near Lewisburg, figures an acre of his farm will supply the year 'round forage needs for one cow. He has a herd of about 80 head of Jersey and Holstein cattle, and keeps 50 on the milking line. His gross income on milk last year was $20,000, but because he raises no corn or small grain a quarter of this went for dairy feed. Skaggs thinks, however, that by artificially curing his hay he can cut this annual feed bill considerably and increase his net profit.

"I haven't any idea of what the carrying capacity of my farm can become," he says. "The better the pastures and meadows get the more stock I can feed and there is no indication yet that my pasture and hay production is reaching a limit. Last year I made five silos of grass silage, about 350 tons, and had one silo unopened when grass came in the spring. Now I can increase my herd to take advantage of the extra feed. It's like eating bread and jelly; it doesn't come out even."

Skaggs' farms covers 120 acres, and he rents another 30. There are four houses on the place and three families. Skaggs and his wife, their married son, Dick, and their married tenant make their entire living from the farm. Skaggs' stepson, Bill Russel, makes about one-half of his income from the farm and spends the rest of his time as the artificial inseminator in the area. All four houses are equipped with modern conveniences which the Skaggs readily admit had their beginning in good grass crops.

"When I bought this farm in 1943," he says, "the pastures were all broomsedge and running briars: broomsedge so thick that if you fell down in it they wouldn't find you for three days."

Over a period of years he took one field after the other out of his three year rotation and turned them to growing grass. Today half of his land is in pasture and half in meadow. He could not eliminate all his corn fields at once. To replace the corn he had to first produce grass crops of high enough quality to insure a profit from his animals. "We don't raise a stalk of corn. It's not that we have anything against corn silage, but good meadows last five years and mean less work, especially since we have our field chopper. They also eliminate growing wheat which was always a low value crop."

Skaggs' pastures are the native bluegrass and white clover. He never reseeds these fields. They are manured every three years and every two years they are treated with 500 pounds to the acre of 0-14-14.

His meadows last about five years without reseeding. He is reseeding one field this fall because he estimates that it will produce only about three tons of hay to the acre. "Should go six or seven," he says. Because this field is comparatively level he will plow it and work up a seedbed. On steep land where erosion is a danger he would use a double disc until all the grass was worked into a mulch. His meadows are a mixture of twelve pounds of alfalfa, four of red clover and a pound of ladino. He uses oats for a nurse crop and generally puts the oats in a silo the following summer.

His meadows are generally knee high on a medium sized man by early May, which helps account for the fact that he consistently puts up 10 tons of grass silage from an acre of meadow. Skaggs' high quality silage is one of the keys to his success.

"Our grass silage is as good as our corn silage," he says. "More than once we have run out of corn silage in the past and switched right to grass silage without

WATER IS A BIG PROBLEM in the Greenbrier Valley. Handley Skaggs and his tenant (top) pipe water to a new concrete trough in a back pasture. Dairying is increasing in the Valley. Skaggs' milking parlor (bottom) has eight stanchions, and transparent pipes to take milk directly to the cooler in the adjoining milk room.

disturbing the cattle or getting any drop in milk production."

Part of the reason for this may lie in the fact that Skaggs learned how to turn grass into fine silage without fail. "We never use any preservatives," he says. "Don't have to. But you have to chop the grass fine. Our cutter chops it in half inch lengths or less. We let the chopped forage pack in the silo by its own weight except on the top when we're done filling. After the silo is filled we climb to the top every day for three or four days and tramp it down as much as we can.

"We cover the top with saw-dust. Saw-dust makes a fine capping; we hardly ever haul out more than half a manure spreader load of spoiled silage when we open a new silo. We get saw-dust as old as we can find and if it is well rotted that's so much the better because it packs tighter. We send it up in the blower and put on a foot or so of it. When we start to feed, we scoop the saw-dust off the top

(Continued on page 116)

HARD FACTS ABOUT

A LOT of farmers are thinking of going to grass because, the way some people tell it, the cows do all the work. Grass farming is a good thing for most farms, the salvation of some, and downright foolish for others. Before selling the corn planter and taking the plunge you'll want to know about the pitfalls as well as the profits.

The great danger of grassland farming comes from the man who hears his neighbor say: "I used Great Crimson Seed Number 12 and got the prettiest stand of red clover I ever did see!" Visiting the neighbor's field, he takes in the heady fragrance of a million flower heads going into quarter bloom, while 20 acres of them ripple like a great green lake. In winter, he buys Great Crimson Seed Number 12 and next year has his usual patchy field with a stand of clover here, and a better stand of wild mustard over there.

A thousand "little things" establish the super pastures on a grassland farm. No one of them by itself is all-important; none so precisely proved by science that we can say: "This is exactly right." Some of the things you know so well turn out to be the poppycock of the next generation.

Grassland farming, like any type of farming, is a matter of using hard won "know-how" tricks. Here are a few that experienced grassland farmers have learned to follow.

"Go into grassland farming one field at a time," Shillo Banks of Monroe County, West Virginia, says. "Convince yourself that you can grow mixed grasses, that you can actually produce a super pasture that will fill 4 rings of a 16 foot silo from an acre's first cutting, and won't heat or turn brown. Our grass silage is as green in December as it was in June; never brown, only a few shades deeper green. Show yourself that you can grow mixed legumes and grass, 6 ton to the acre and that you can bring it in as hay so it won't steam, lose its leaf, color or fragrance. When you can both grow it and store on a small scale, in a wrong-way season, you're ready to move into grassland farming. It's dynamite to change over until you know enough to make good in one field."

How To Do It

Most grassland farming specialists agree with farmer Banks that this new farming craft should be learned one field at a time; and also that there is a clear recipe. C. M. Long of Lafayette, Indiana, who has put in several thousand acres of super pasture, says: "I can tell you how to put one field into a super pasture and guarantee it will work if you will follow directions. Let's look a few facts straight in the eye. If you're a man with a corn planter that has skipped a couple of rows the last two seasons; if you're a dairy farmer who doesn't keep milk weight records because you can pretty near guess what your cows milk out; if you're a hog man who doesn't waste money on minerals because a hog can root out all he needs—you're going to be the same kind of grassland farmer. You'll have a seed drill with one or two rotted fertilizer pipes and a couple of drag chains will be lost or buckled together. You'll cut 5 acres of silage at a crack, with one tractor and no other help, because you'll always bet it won't dry out or get rained on.

"The kind of man who succeeds at grassland farming is a realist. He prepares for the worst and that's why he seldom fails.

"Here's my system for putting a thin field into super pasture. It's plenty work and investment. If you chisel a corner, it cuts results.

"Choose a small thin field of 3 to 10 acres for your trial, so that if you fail, too much won't be lost; and, if you succeed, you have confidence based on reality, not luck. Soil test it, first. The commercial fertilizer people will soil test your field free. But they aren't farmers who have to grow grass on that field. They'll give you an analysis, sometimes, on two borings from a field, unless you walk around right with them. You want one boring for each acre, and you should tell the fertilizer man where to bore because you know the field better than he does. Stay away from the best and the worst spots. On a 10 acre field, take 10 borings that you know are average land spreads.

"In half of our counties, the county agent will run soil tests for a small fee and give fertilizer recommendations. Bring the pH up to 6.5 anyway, with lime; and if the potash and phosphorus show P (for poor) to Good minus, use 0-20-20. I'll give the amounts in a minute. These days you want to order your fertilizer ahead of the season or you'll have to settle for whatever kind is left.

"The old way of starting a hay pasture is to sow rye as a nurse crop in autumn and hand sow clover into it in February. There's always a local man who will tell you he did that and got beautiful red clover. He did, too. But either he didn't tell you the other 16 things he did, or he was successful that year because nature was with him. My plan of grassland farming is based on the fact that nature is usually against you. By constantly anticipating trouble you can beat those nine years out of ten when the season is off.

"You begin in the earliest part of winter. If you need lime, put it in now, based on your soil tests. If you can give the field 2 spreader loads of manure to the acre, do it now. Then, in March or April, several days after a heavy rain, when the disc cuts clean and the earth doesn't puddle, disc the field up to four times if the soil is tight and of a clay type. Afterwards, pull a drag harrow over the field.

"Under all conditions the seed bed should be firm and shallow. All grass seeds do better on shallow seed beds than where the land is worked up deeply. Preparing the land with a disc or field cultivator or both is better than plowing. Where the plow is used, the connection between the furrow slice and the soil below is broken and the moisture condition of the soil becomes less favorable than when discing takes place. This is especially true if crop residues like straw or stalks are turned under. It is also true if a sod is turned under.

"In all cases the discing should be thorough. The field should look like it is ready to be seeded to wheat. To those who have been used to using the plow, the discing method of soil preparation will look quite ragged and unbusinesslike. Don't let this fool you.

"Then, using the fertilizer recommended by your best local authorities, based on detailed soil tests, sow nurse oats* and grass. Oats should go in at the rate of six pecks to the acre. Fertilizer is used at least 400 pounds to the acre; heavier if soil tests show the need for it.

"A spot check of 50 seed drills in one county showed 15% of the fertilizer pipes were stopped up and 60% had faulty grain seeding attachments. In grassland farming, a drill that isn't in top shape murders the whole program. Since the fertilizer must be used at a high rate, often 400 pounds to the acre, this presents a problem. Although farm manufacturers are usually right up with the farmer, all of them have not kept up with grassland farming in making drills. Many older grain drills hold only 200 lbs. of fertilizer and have narrow steel wheels which cut deeply into moist spring ground if the fertilizer box is overloaded. Yet,

* If spring oats do poorly, see note on page 96.

GOING TO GRASS

the 200 pounds to the acre some seed drill fertilizer boxes hold is *not enough*. You'll have to stop your drill every ½ acre and load up again on fertilizer.

"There's a reason for that 400 pounds to the acre. The seedlings need a boost or a drought will kill them. They must get up and grow right away—not in three weeks. You have to prepare for the worst at all times because that's what the farmer gets. Only by putting on fertilizer heavily will you be assured that the legume seed gets the quick growth it needs to shoot up high enough to beat a short spring drought.

"The legumes in your grass mixture will turn runty and let the stronger grasses take over unless you protect them with heavy fertilizer spreading. When the grasses grow 3 feet and the legumes grow only 7 inches high, you have silage that dries out too quickly and hay made from it isn't palatable. *A grassland farmer is a one-crop man and that crop must be right.*

"That 400 pounds of fertilizer does something else. The brome and orchard grass love to grow rank; if they are starved for potash and phosphorus they tend to yellow at the bottom of the stem. At the same time, the brome and orchard in the little valleys in the field, where the ground is more moist, will be greener because the water leached out the extra minerals for these plants. When brome and orchard grass have slightly yellow stems they ruin grass silage because they are too chaffy and hold the air in. You stamp them down in the silo and four hours later the level of the silage has sprung right back. The purpose of my program is to grow eight tons of grass to the acre of the kind that makes first class hay or silage.

"If turned into a meadow of brome and orchard that is over knee-high, and legumes that are scattered here and there seven inches high, the cattle will eat out the succulent legumes. The trick is to keep the orchard and brome from running away with the legumes. That heavy fertilization is one trick that helps. You are shooting for a meadow that produces eight tons of hay to the acre. If you make two tons to the acre, you are in the same position of the Iowa farmer who raises 20-bushel corn.

"A good eastern and central U. S. grass mixture is five pounds of brome, one pound of orchard grass, two pounds of Kentucky 31 fescue, two pounds of timothy, four pounds of alfalfa and a half pound of ladino. If that half pound of ladino seems light, remember it has 700,000 seeds to the pound. Inoculate the legumes and then sow the brome, the orchard, and fescue separately either with a hand seeder or a force feed low wheel lime spreader. The orchard, brome and fescue don't go through the grass box evenly. Then drill in the oats, timothy, ladino and alfalfa with a heavy application of fertilizer. The fertilizer should be dropped *behind*, not ahead of the seed. This is helpful, not vital. This should be done right after drag harrowing the field in early April or late March. Be sure the drag chains on the drill are all there. If you have an eleven hole grain drill and three drag chains are missing, it means that a third of your grass seed won't be covered up the right way with pulverized earth. If you think it doesn't matter, you are in the wrong business.

"Oats and grass seeded this way into a field prepared in this manner SHOOT RIGHT UP with their first spring rain. They do it all the time; not just in an occasional good year. They do it every year, in every field. They never miss. Your gun is always loaded and it always fires. This field will require no care until the oats are ready for either the combine or the mower. The field should always be mowed when drought threatens. Dairy cows, especially, like oat hay as a variety. Fed as a variety feed to give the cows a little change in hay, it won't matter too much if it is rained on a day or if it is cut three or four days before or after the soft grain heads bleed milk when you squash them.

"The time for making oat hay is a week before the stem starts to yellow up at the bottom. If you make oat silage, bring them in between bloom and milk, and be sure to cut it fine (½ inch) and tramp it because the stem is hollow and holds air. If you can't cut that fine, make hay or combine it. After the oats are off, in two weeks, you might have a weed infestation that looks like it will hurt next year by seeding itself. If so, be sure to mow it. This field is getting ready for four years solid service of eight tons to the acre and repays all the attention you give it. In early autumn, pasture it lightly with a young heifer to the acre for a few days. Stay well this side of using it even moderately. In October top dress 2 spreader loads of manure to the acre and be sure it is chopped up fine.

"The following early spring, top dress this pasture once more with the same commercial fertilizer you used before —this time 200 pounds to the acre. A week after the cherry trees bloom you can see if the brome is getting too strong for the legumes. If it is, and the legumes are of good height and abundance, turn the cows in to eat down the brome. But if the brome is plentiful and tall and the legumes of dainty growth, mow the field high. Otherwise, if pastured, the cattle may go for the legumes first and damage them. Your top dressing of fertilizer gives the legumes the shot they need, and it protects them against a spring drought or a summer dry spell. Let the cattle take this field down. It will take four cows to the acre ten days to do it and it will come back ten days after the first rain. In late November drag it to spread the manure. Each spring top dress it again with 200 pounds of commercial fertilizer. If you top dress before the first cutting, you get 20% more from your fertilizer money.

"Grassland fields handled this way live for four years and the soil sucks up fertility from the legumes, the manure and the fertilizer like a vacuum pump hosing in air. In making silage from these fields all you have to remember is to cut only what you can easily put up in one day. Chop it very fine, a half inch to an inch. Don't mow five acres before noon Monday and put it up Tuesday. Mow two acres Monday and put it up Monday. You're making a party cake, not mining coal. I like grass silage from fields with a lot of legumes (50%). If brome or orchard predominate (80%) it will be too chaffy to cut fine and will hold air and spoil. If the silage gets dry (because it wilts over two hours) you can wet it down by hosing 50 gallons of water for every ring you filled with too dry silage. If there is oat straw in the field, don't let the silage wilt, as the straw will suck up the moisture and make the grass chaffy and full of air.

"Should silage be wilted in the field after it is cut and do you need a preservative?

"The answer depends on what you've got in the field.

"If the mixture is 40 to 50 per cent legumes, with the rest grass, and your chopper will deliver a half inch or inch cut, you don't need wilting or a preservative.

"The main idea is to deliver chopped hay to the silo at about 60 to 70 per cent moisture. When you twist the stem and get droplets of moisture that don't run off, it's right. If the chopped hay leaves your hand moist, it's OK; but if it leaves your hand wet and slippery, you need a

(Continued on page 94)

A WAGON LOAD of 5-10-5 bag fertilizer is needed for a twenty acre field of corn, but only a handful of trace elements. The farmer is confused about how to put it down; he needs help.

TRACE MINERALS AND THE FARMER

The schoolboy learns in the first chapter of his new chemistry book that all the things that creep, crawl, fly, swim or burrow, and the earth and the air around it, are made up of about 98 elements. He marvels at the infinite variety of combinations and scratches his head in wonder when he learns that the carbon in an arc light and the bulk matter in corn cobs are one and the same thing.

A little later he learns that of the 98 elements, approximately 60 are found in plants or animals. One third of these are essential for either plant or animal and a few more are on the probable list.

The bulk of every living thing is made up of a relatively small number of the elements, the "big four" energy elements (carbon, oxygen, hydrogen, and nitrogen) make up 95 per cent of the plant or animal, and the ash elements (phosphorus, potassium, calcium, magnesium, silicon, aluminum, sodium, sulfur, and chlorine), make up almost all the remainder. The so-called trace elements, minor elements, or micronutrients, depending on which college you are writing from, account for one per cent or less of the total weight, except in unusual cases, or in some so-called accumulator plants which may absorb unusually large amounts of certain elements—for example: selenium, aluminum, or silicon.

These elements may be plentiful in nature, as iron is, but the word "trace" is used because only an infinitesimal bit is needed in the plant or animal.

It is a matter of opinion, but those generally regarded as the most necessary are boron, manganese, copper, zinc, cobalt, iodine, molybdenum, and iron. Some others such as aluminum, silicon and fluorine are believed by some to have a place in animal or plant welfare, because they are found in trace amounts in the dry matter, but the scientists are disagreeing on that, too.

This inability to agree on which of the trace elements are necessary to the happiness and welfare of plants and animals is an example of the confusion which seems to seize on anyone who begins to investigate trace minerals. The subject is literally an invitation to a scientist to

TRACE MINERAL HUNGER SIGNS AND WHAT TO DO ABOUT THEM

TRACE MINERAL	NEEDED BY	DEFICIENCY SIGNS AND FUNCTION	AMOUNT NEEDED PER ACRE OR ANIMAL	FORM TO APPLY	DEFICIENCY AREAS
BORON	PLANTS	Brown discoloration of cauliflower, cracked stems in celery, tobacco "top sickness," black spots on beet roots, dwarfing of alfalfa, corky areas in apples. Necessary to bud growth.	10 to 20 pounds per acre.	Fertilizer Grade Borax.	General
MANGANESE	PLANTS AND ANIMALS	PLANTS: Dark green veins in new leaves, fading of interveinal tissues, poor growth. High pH locks up manganese. ANIMALS: Slipped tendon in poultry, slow hatching of eggs, enlarged hocks in hogs, retarded milk production. Essential to secretion of sperm in male animals.	PLANTS: One part to one million. Depends on pH. ANIMALS: Six ounces to one ton of poultry feed. Hogs need less.	Manganese Sulfate.	Scattered
COPPER	PLANTS AND ANIMALS	PLANTS: Dieback in citrus trees, dwarfing of tomatoes, pulpy onions, retarded growth. Aids in chlorophyll production. ANIMALS: Anemia, paralysis, ataxia, falling disease, phases of "salt sickness." Copper is also a catalyst, essential to the utilization of iron.	PLANTS: Up to 200 lbs. an acre on peat. Others less. ANIMALS: One or two milligrams per day.	Copper Sulfate and Oxide.	Peat soils. Atlantic Coast Plains.
ZINC	PLANTS AND ANIMALS	PLANTS: Top blight of pecan and tung trees, white bud in corn, dieback of citrus trees, reduced fruit, mottle leaf in citrus. ANIMALS: Thickening of skin, loss of hair. Essential to secretion of digestive juices. Perhaps causes X-disease in cattle.	PLANTS: Half pound for each inch of tree diameter. ANIMALS: Rarely need more than natural feeds supply.	Zinc Sulfate, Zinc Carbonate, or Metallic Zinc.	Pacific Coast, Utah and Coastal Plain in South.
COBALT	ANIMALS	ANIMALS: Pine disease, salt sickness, depraved appetite, anemia, retarded sex, muscular atrophy, failure to gain weight. Essential to growth of micro-organisms which permit utilization of B_{12}.	ANIMALS: Two grams per one ton of cow feed. Two ounces per acre per year on a pasture will supply the animal. Less expensive if added to feed.	Cobalt Sulfate and Carbonate.	Atlantic Coast Plain, Fla., Mich., Wis.
IODINE	ANIMALS	ANIMALS: Goiter, enlarged necks in calves, colts, and pigs, and hairlessness in pigs. Essential to functioning of thyroid glands. Essential to protein utilization.	ANIMALS: Small amounts, such as in sea salt and iodized salt.	Potassium Iodide.	Goiter Belt, north half of U. S. to Penn.
MOLYBDENUM	PLANTS	A catalyst which permits bacteria in nodules of legumes to change atmospheric nitrogen to ammonia. Essential in reduction of nitrates to ammonia in non-legumes. Lack causes necrosis of leaf edges. High pH increases availability. Too much in plants causes scours, rough coat, loss of weight in animals	One ounce per acre.	Molybdic Oxide or Sodium Molybdate.	Scattered and N. J.
IRON	PLANTS AND ANIMALS	PLANTS: Chlorosis in new growth. Aids in function of chlorophyll. A high pH will lock up for plants. ANIMALS: Nutritional anemia. Needs copper to be utilized in formation of hemoglobin of blood. Salt sickness.	PLANTS: Usually sufficient in soil unless locked up by high pH. ANIMALS: Sufficient under natural conditions.	Oxides and Sulfates.	Florida.

In addition to the above trace elements, severe deficiencies of magnesium are found on the Atlantic coast plain and there is a general lack of sulfur in the soils of the Pacific Northwest. Magnesium deficiency is remedied by the use of dolomitic, rather than calcitic, limestone. Sulfur deficiency is remedied by the direct application of sulfur.

learn more and more about less and less and to lose sight of the forest for the trees. Hanging around on the fringes of the laboratories are a host of quacks, false prophets, and viewers-with-alarm, who becloud the real issue and in the end confuse the poor farmer who always seems unable to get a simple answer to a question which to him appears easy.

Some say, for example, that manure is the solution of all the problems of deficiencies, that manure will unlock nature's vast storehouse of minerals and make them available to plants; but the next scientist says manure will lock up the trace minerals and points to peat soils, which he says needs almost all of them. Other scientists say that some of the minerals will lock up others, and frighten the farmer who is afraid to mention the subject when he is within hearing of his fields.

When the prophets and the crusaders take over they blame every evil of nature —poor crops, disease, ill health, on either deficiencies or surpluses of the trace elements. From a vast ignorance they offer a panacea—and strangely enough, few scientists know enough about the subject to say they are right or wrong.

One sometimes wonders if there is not a lot of double talk being passed out by scientists who know they are on the track of something important, but as yet have seen nothing but the tracks. No doubt the deficiencies of the trace elements are not as serious as some would have us believe. Our span of life is going up each year and we are raising bigger crops; the Europeans are doing better farming and getting bigger crops and haven't been laying awake nights worrying about the trace elements. Many a peasant reaps 80 bushels of wheat from an acre of ground which has been under cultivation for 1200 years, and he never heard of the trace elements.

If this article were limited to what is actually known about trace minerals and their functions it would be short indeed. As it is, it will be only a sort of progress report, a review of the host of theories and suppositions which are prevalent. A definite statement of fact will be so rare

in this article that it may be the exception rather than the rule.

A Few Good Theories

Apparently not all the trace elements are needed, either by plants or animals. There's a great deal of disagreement on this point, but most thoughtful scientists agree that plants need boron, iron, molybdenum, copper, manganese and zinc: animals need copper, manganese, zinc, iodine, iron, and cobalt. One or two, like copper, may at times be catalysts, not being used themselves but making other elements usable because of their presence.

Trace Elements and the Farmer

The farmer, sooner or later, was bound to be drawn into the free-for-all. He began to hear that the reason his sheep weren't catching and his alfalfa wasn't doing well might be because his soil needed trace elements. It was like hybrid corn and 2-4D—something that affected his profits. So he sat up and began to ask questions.

His first question was: "How do I know if my soil or my animals are deficient?" He was told that if the trace mineral deficiency is great it will be noticed in certain peculiarities in plants or animals: if the deficiency is slight, he may never know, for a farmer never knows if his soil is or is not producing the maximum or if his pigs are as good as they could be. In any given year he has no yardstick, for a short crop can be caused by weather, pests, his own shortcomings, or a hat full of other factors. If the deficiency is pronounced his pigs may die or be born without hair. This he can see plainly and he plainly knows there's not enough iodine in his soil. But if the deficiency is slight he has no way to measure how far away he is from the best.

Two of the trace elements necessary to life are cobalt and iodine. If these are entirely lacking, the animal dies. Deficiencies in others of the trace elements in plants and animals will show up in unthriftiness, poor doing, and various diseases. Iodine deficiency produces hairless pigs, cretinism (a condition in humans similar to idiocy) and enlarged and deficient thyroid glands: a cobalt lack will retard growth and sex life, affect breeding, muscular inco-ordination, and anemia: lack of iron will produce anemia and salt sickness, and lack of manganese will cause slipped tendon disease in poultry. Lack of copper will cause anemia and nervous disorders.

When the deficiencies are slight the effect may be slight too. It is difficult to convince a farmer that his pigs need trace elements. "They are doing as well as they ever did," he says. He has no super pig to use as a measure of their doing, and he hasn't the time nor inclination to run a test.

The best known deficiency signs in both plants and animals are shown in the accompanying chart.

The Second Question

The farmer's second question was: "How can I apply a trace element to remedy a deficiency?" Scientists haven't begun to agree on the answer. Some of them, including those who represent the manufacturers of trace element mixtures, say that if a farmer buys a bag of stuff made up of all the trace elements and spreads it, say 50 pounds to the acre, over his farm, his deficiencies are in a fair way to vanish. This is indeed a happy and easy way to cope with your problem if your soil is deficient in all the trace elements in just the exact proportion as they are represented in the bag. But few soils are that agreeable. If the soil is deficient in only one or two, then the addition of the others may cause too great amounts of those, and, in the case of boron, for example, a toxic amount could be present and the plant is poisoned. Dr. Frank Gilbert, of the Battelle Institute, a thoughtful scientist who has spent most of his professional life in studying soil chemistry, says, however, that there is rarely danger of getting too much of any one element, except boron, if the farmer uses moderate amounts. Heavy soils or light soils with enough organic matter will soon reduce the harmful amounts of the trace minerals to a non-toxic state.

The best way to use a shotgun mixture of the trace elements is to get a bag (it costs about $6.00 per 100 lbs.) and try it out on part of a field in varying amounts. From this simple test a farmer can get a good line on his own soils.

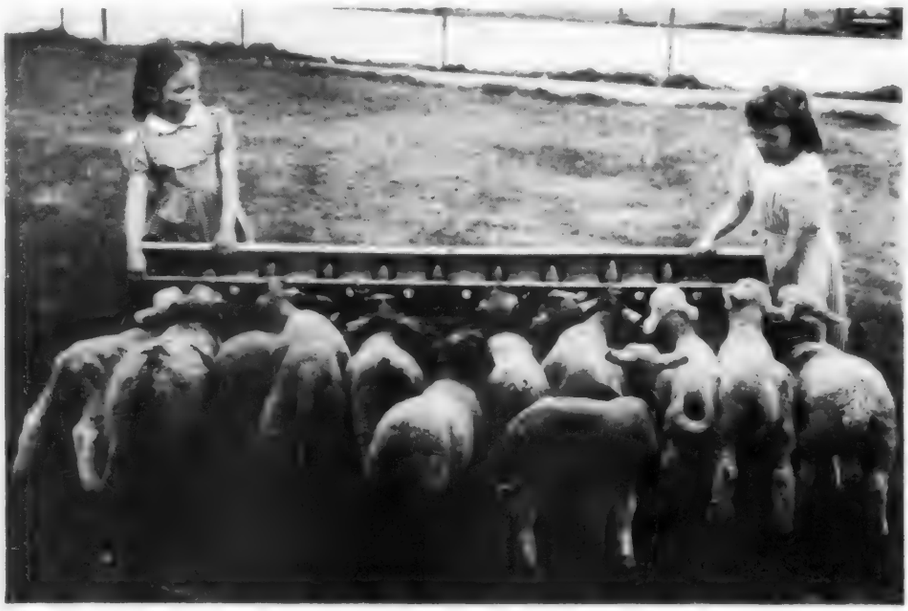
It has become quite common for the fertilizer makers to advertise trace elements in their standard fertilizers. The catch here is that no one knows the analysis of the trace elements in the bag except for boron, which some states require. The purchase of trace elements in this form is certainly a step in the dark, but it might do some good, and probably will do no harm.

If you have had a quantitative soil test made and know the exact deficiencies, then you can order the needed elements and apply them with your regular fertilizer. This is not as easy as it sounds either, for some of the minerals you can buy only in a drug store and you'll likely carry them home in your pocket. How to mix a pinch of molybdenum evenly in several hundred pounds of fertilizer would be a problem on any farm. Some fertilizer makers will include your needed trace minerals in your regular formula if you are a big customer, or they will make up the mixture for you and charge you for it. This is the only method of applying trace elements to the soil which is in any way foolproof.

If ignorance is costly, knowledge is not on the free shelf either. A complete quantitative soil analysis costs from $50 to $75, and that's too much cash to spend on what many farmers still believe is pretty much of a gamble. But a soil test does reveal the shortages and once they are known a beginning can be made in supplying them.

The case for the shotgun mixtures is that it is cheaper than a soil test, which is the only sure method of dealing with deficiencies. But all mixtures should be tried out on small areas before treating the whole farm. One of the most important reasons for this is what the scientists call "antagonisms," which is another secret of the soil only vaguely understood. Certain elements, if present in the soil in too great amounts, lock up others and make them unavailable to plants. An example is found in California, where magnesium

HERE IS HOW one sheep raiser solved the motherless lamb problem. Lack of cobalt often causes breeding troubles in sheep; ewes die at lambing time or catch poorly.



THIS STRANGE NEW TOOL is a Blue Nitro-Shooter. It shoots ammonia gas into the soil at a controlled rate to give from 2 to 200 pounds of nitrogen an acre. The operator, above, has lifted the gas-distributing tines to inspect the gas flow. This specialized tool applies large quantities of pure nitrogen efficiently. But there are no trace minerals present in the ammonia gas as there are in manure, or to a lesser degree in bag fertilizer. So the farmer has all the more reason to supplement his supply of trace minerals in the soil when he uses modern, streamlined methods of applying fertilizer.

has made all the zinc unavailable to the fruit trees. The orchardists have gotten around the problem by driving zinc nails into the trees or by spraying with zinc, since they can no longer use zinc in their fertilizers. This, rather than toxicity, is the great danger of adding shot-gun mixtures; one deficient element may be improved, but a little too much of another is put down. This locks up one of the other trace minerals and then there's a deficiency for the plant to overcome.

At this point we come to the nub of the trace element mystery, the part the so-called antagonisms play in causing deficiencies. Dr. Frank Gilbert, with the characteristic caution of the scientist, says, "The need of trace elements in many cases can be laid to mineral imbalance rather than actual deficiencies."

Certainly if all the minerals in the soil were properly balanced many of our fertilizer and plant troubles would vanish. This opens an entirely new question, for it involves the use of manure, the use of compost vs. the use of commercial fertilizers, and the presence of the proper amount of organic matter in the soil. It supplies, too, the best answer of why a shotgun mixture of the trace elements often backfires. But the scientists haven't yet told us what the proper balance is, so we'll have to fumble along for a few more years.

There are those who say that organic matter is the solution to the whole problem of trace mineral deficiency. The fellows in this school say that a high humus content of soil will make available the trace minerals, which are quite sufficient in almost all soils. They may be right to a point, yet they have not answered the muck and peat soil question; some scientists say in these soils trace elements are locked up by the high humus content. Others say the trace elements are absent or almost absent in peat and muck.

(Continued on page 131)

THE TOBACCO SPEAR, used for threading tobacco on drying sticks, is an old familiar tool to Dave Lapp. Whatever the crop, he thinks a farmer should protect the soil. "God gave us the land to take care of," he says, "and these new soil conservation ideas help us do a better job of it."

PLAIN PEOPLE Grow Big Tobacco

Dave Lapp, of Lancaster County, Pennsylvania, started working in the fields when he was six and by the time he was ten he was handling a team and plow. "I was a natural born horseman," he says. "I just always got along with horses. Once when I was working for a neighbor we were using two teams and two low bed wagons. We'd haul the full spreader to the field with three horses. Once we stalled and he rode back to the barn for the other horse. When he got back I had moved the load up to the field with the two horses. He never said a word to me, but he told neighbors about it for a long time."

Dave retired from the farm nine years ago. At 71 he still works, for the Mennonite farmer never stops working as long as he can get on his feet. "I drive a truck now for a blacktop company," he says. "I work about 54 hours a week. But I still like to drive horses; like to have a pair of reins in my hands. It feels different than a steering wheel. There's something at the other end that man can't make."

When Dave Lapp was a young man with a family coming along he decided to give up farming for wages. He looked around for a farm to work on the halves, but a tenant farm was rare in Lancaster County. He heard of a farm for sale down on Pequeway Creek and he went down there and bought it. It was very ordinary by Lancaster County standards, 80 acres, some good fields, some very bad, covered with granite boulders. "It looked like a rock garden," he says.

His sons John, Ben and Elmer were big enough to help by then and they spent many a winter day trying to blast the boulders off that sloping 20 acres and move them down to the creek with teams. About the time it looked like an endless job, Dave called in a bulldozer and had the whole field cleared of "iron boulders" in three days. "We lined the bank of the creek with them," he says, "and kept the water from widening the creek. Now we almost wish there were more boulders.

When Dave retired from the farm, Elmer took it over and started concentrating on grass and dairy farming more than his father had. "He has the whole farm contoured," Dave says. "And it looks fine. A lot of farmers are too slow to take up with a new idea. That contouring is so simple and useful I don't see why somebody didn't think of it a long time ago. We're still letting too much of our good land wash down the Sequehanna and into the Chesapeake Bay. Down near the river some of those farms are about done. Used to be we took a lot of pride in straight rows, and a lot of people around here still do."

As long as he worked on his farm he followed a four-year rotation of corn, wheat, hay, and tobacco. "We were always fond of pasture," he says, "and even back in the 20's we were adding some nitrogen to the pasture beside the manure we always put on.

"For a long time we hauled the manure out in a 'low down' wagon, and spread it by hand. Then in 1918 I got my first manure spreader. That helped because we always manured at least half of the farm every year."

The major cash crop on the Lapp farm was at that time the three acres of filler tobacco, even though nine cents a pound was often considered a good price. The Amish and Mennonites of Lancaster County have grown tobacco as long as they have farmed their rich, rolling hills and valleys. They have no rule against smoking or chewing the tobacco they grow, and even the Old Order Amish, who refuse to use tractors, automobiles or radios, partake of the weed.

Dave Lapp belongs to the New Order. He owns a car and radio and uses modern agricultural methods. He once smoked cigars. Then one day he decided that the habit was contributing nothing to his welfare or his bank account, so he gave it up. Today, the New Order Amish, rather than the old, are the strongest enemies of tobacco and some of them refuse to grow it or work on a farm where it is produced. And many of them agree with John Lapp's wife, Anna, who says, "I don't see why we have to work so hard on something that doesn't do anybody any good. Tobacco doesn't keep people alive."

But even so there is a good feeling about seeing the new tobacco crop come along in fine even, dark green stands. Dave likes to spend an occasional day over at John's helping with the tobacco or the potatoes. Both of his sons are fine farmers, for by the time they left home Dave had taught them about farming and what he taught stayed taught. John, for instance, grows tobacco, potatoes, corn, wheat, and livestock on 87 acres with a skill that has brought his family

(Continued on page 80)

TOBACCO FARMING is a year 'round job on John Lapp's farm. During the summer John (on tractor) and his children cultivate it repeatedly. Frances, the oldest chid (center), helps with the harvest. The tobacco is barn dried until stripping time.

FIGHTING

DON PEPE MADRAZO squinted in the bright Mexican sunlight. "You know, most people have the idea that raising fighting bulls is something very dangerous and complicated," he said tugging his straw sombrero further down on his forehead. "Actually, it is a simple matter. At least it is," he smiled, "for those who are used to handling them."

Jose and his brother Francisco Madrazo, familiarly called Don Pepe and Don Paco, are the owners of *La Punta,* a typical fighting bull ranch located in the state of Jalisco close to the exact center of Mexico. Here the country looks very much like parts of our own southwest. It is a dusty, windswept tableland broken abruptly here and there by low mountain ridges. Mesquite and cactus grow there, and little else.

"It is a healthy cattle country," Don Pepe says in his precise Spanish. "We are outside of the hoof-and-mouth disease zone. The only important cattle disease that is common here is anthrax, which we control by inoculation."

The fighting bull is the result of generations of breeding to produce a special purpose animal. All of the breeding and the care and handling of the bull are aimed at producing an animal that will enter the ring in a mad rage, endure the bloody jabs of the *picador's* pike and the pain of the *banderilleros'* brilliant darts, and still retain the vitality to meet the *matador* in the final pitting of horn against steel. Above all he must have the venomous

fury and courage to attack the bullfighter, whose aim is to manage the bull with skill and elegance, avoiding the deadly horns, but only by the most breathtaking margin.

The modern *toro de lidia,* or fighting bull, is a smooth, compact animal whose build is designed for enormous power and speed. Because of his role in the ring, he is not very large, but is scaled to human proportion. Weights usually run between 1000 and 1200 pounds, which makes him a little lighter than a Jersey bull, which he somewhat resembles, but weight in itself is unimportant. The most highly-prized characteristics are those of conformation and temperament. The outline of back, neck, and top of head approach, ideally, a straight horizontal line. This is in order to have the force of the body directly behind the horns and to place the head and horns down within the bullfighter's range. Horns are well-developed and point forward. Temperamentally, the fighting bull must have the disposition of a tiger shark. He must have a fierceness that causes him to charge all the harder when injured.

"Getting in the way of one of those bulls," a Mexican bullfighter remarked recently, "is like getting hit by a truck—a truck with a pitchfork attached to the front bumper."

When only mildly irritated, the fighting bull is capable of overturning a car or of lifting an emaciated bull-ring horse with the *picador* high in the air with one mighty heave.

Today's fighting bulls are all descended from Spanish stock. There are two breeds. The most important of these is the Vista Hermosa, which was started by the Count of Vista Hermosa in 1790. The other breed, the Vasquena, developed by Vazquez around 1800, is tending to disappear. Eighty per cent of the modern animals, including those at *La Punta,* belong to the Vista Hermosa breed. Careful selection during the last 40 years has done much to perfect this breed.

A livestock business centered around animals that must be killers to be of value involves a number of peculiar problems, as anyone who has ever skinned over a fence a few inches ahead of a set of sharp horns can well imagine. *La Punta* comprises about 37,000 acres partitioned by more than 100 miles of three-strand barbed wire fence. Someone is riding fence constantly. The bulls are kept in separate small groups called *corridas,* usually consisting of six bulls which will be sold together and fight on the same afternoon's program. The *corridas* are widely separated from the cows, but even so the Madrazos lose two or three bulls each year because of fighting among themselves.

Testing Bulls and Fighting Heifers

Every fighting animal on the place, whether bull or heifer, is tested for fighting qualities as a two-year-old. Two men, known as *derribadores,* attack the bull with iron tipped lances from a jeep.

The bull is attacked from the side that is away from the pasture that has always been home to him. The *derribadores* are careful to keep the way clear for the bull to run back to his pasture if he wants to. The bull that turns and runs away doesn't live to fight another day, but winds up very quickly as the *carne* in someone's bowl of *chile con carne.* If he turns on his tormentors and fights, he wins two more years of carefree ranch life with three squares a day served up regularly. An average of about fifty per cent of the two-year-old bulls pass the test honorably.

The finest bulls of all, the bravest and most perfectly proportioned, are set aside as studs. They are of service age at four years and are retired at the age of 10 or 11. Each stud is put with about 35 cows for half the year. The rest of the time he rests, eats, and regains his weight.

Back in the 1930's, the Madrazos used to import studs from Spain, but they haven't received any since 1939. First there was the war and then the hoof-and-mouth disease problem. This disease is common in Spain and the Mexican government, which, in cooperation with the United States has spent several hectic and expensive years combatting it, forbids the entrance of possibly infected cattle. Since little is being done to combat this disease in Europe, Don Pepe thinks they may never import any more animals.

"This may result eventually in a difference between Spanish and Mexican fight-

BULLS

BY RICHARD GROVE

THE BULLFIGHTER (top of opposite page) seems indifferent, almost scornful, of the pain-maddened bull which is trying to impale him. The fierce courage of fighting ancestors is bred into this bull. The bullfight fans know the farms from which the best bulls come, and posters feature the breeder almost as prominently as they do the imported bullfighters.

THE COWBOYS (right) are cautious when they handle the black fighting bulls. An angry bull could toss horse and rider off the ground with one powerful heave. The placid spotted oxen are trained to herd with the bulls and serve to keep them calm and tractable during round-up.

ing bulls," he said. "I am sorry, for I feel that we need the Spanish breed in order to maintain our fighting bull standards."

Selection for fighting qualities is not limited to the sire. A docile cow would be culled out of their herd as quickly as a bad kicker would from an American dairy herd. The two-year-old heifers are being tested for a fine waspish disposition at about the same time their brothers are undergoing trial. The heifers, however, are put through a regular bull fight in *La Punta's* own bull ring. In their case, the testing is made so rigorous that only about 25 per cent of them are passed into the breeding herd. Only the most belligerant cows are considered fit to bear fighting sons.

La Punta runs some 1000 cows and 40 studs which produce around 800 calves each year. Certain cowboys are in charge of the cows and visit each group of them daily. Each man reports on the cows which have calved. Most cows drop their calves between April and October. The cow must handle her own obstetrics work; she is far too wild to permit a man to help her in case of trouble. The calf is named and numbered for the mother. He remains with her for nine to twelve months, at which time he is separated and branded.

The cowboys keep an eye and a rifle both cocked at all times for coyotes, which are especially fond of veal. The varmint hides in the brush until the cow leaves her calf in search of food, and then goes for the calf.

The pedigree books carry complete data on all cows and bulls. The total number of offspring of each individual animal is entered along with the per centage of these which successfully passed the tests. The field book currently in use takes the pedigree back five generations. *La Punta's* library can provide accurate information back to the time when the Madrazo brothers began breeding bulls for the ring nearly thirty years ago.

Bulls For Sale

Bulls are ready for sale to the ring at the age of four. First-class specimens bring four to six thousand pesos—roughly $460 to $695 at today's exchange. Slightly less desirable bulls go for three to four thousand pesos ($360 to $460) and are generally sold to promoters outside Mexico City.

Eight ranches supply practically all of the top bulls that go to Mexico City, which is the country's sports capital. Mexico's bullfight *aficionados,* or fans, can judge the quality of a bull almost the instant he enters the ring. They will boo a bull which doesn't look or act exactly right, because they know that it takes a good bull to make a good bullfight, regardless of the greatness of the *matador.*

The new arenas are all steel and concrete bowls. Before these were built, emotional fans used to set fire to the wooden grandstands whenever they suspected that the promoter had bought second-class bulls while charging first-class admissions.

Feeding the Fighter

Don Pepe and Don Paco figure that it costs them about 2000 pesos to feed a bull from birth to the time he is sold. *La Punta's* desert acres produce next to nothing in the way of usable pasture. Rainfall during the wet season (June to Sep-

tember) is a scant 14 inches; during the dry season, not a drop falls. The cattle are fed almost completely on feed that must be trucked in to the ranch. The only locally-grown foodstuff is mesquite beans, the fruit of a desert tree that grows wild everywhere on the ranch. They are picked, dried, and ground up, pods and all, with alfalfa. The beans are considered to be excellent feed from a nutritional point of view, and are very palatable since their sugar content is exceptionally high.

The bulls are fed alfalfa up to the beginning of the third year, when they begin a regime of morning and afternoon feedings which consist of a concentrate made up of 40 per cent corn and 60 per cent oats, barley, and ground alfalfa and mesquite beans. The noon feeding is alfalfa. This diet, along with salt, is supplemented every couple of weeks with the addition of a vitamin concentrate.

The cows are fed only alfalfa. Breeding bulls get no special feed during their stay with the cows, but get concentrate during the rest of the year. Calves are given vitamins every couple of weeks during weaning to prevent possible nutritional difficulties.

The ranch has a few small springs which provide enough water for all needs. The water, however, must be hauled to the cattle in a tank truck along with their feed. Each bull, to preserve the peace, has his own individual stone feeding and watering bowls. One man pours water into the bowls and another follows dumping feed from a sack, while several mounted cowboys urge the bulls into the feeding area in their particular enclosure. These men have developed this hazardous task into a system amounting almost to a ritual. They move among the animals swiftly but smoothly, making no sudden movements, talking to them all the while in calm, reassuring voices or making a peculiar low whistle which seems to serve the same purpose. Even so the ranch is not bothered by insurance salesmen trying to peddle a group policy.

Gift Wrapping a Bull

More precarious than feeding and watering the bulls, is the job of loading them for shipment. In order to handle the bull at all he is boxed into a stout individual crate that is designed to keep him from committing mayhem on his handlers or the other five bulls in the *corrida*. Within Mexico, bulls are usually shipped by truck, either one that is sent out by the promoter or one of the Madrazo brothers' five-ton jobs. *La Punta* has its own landing field, however, and certain Mexican rings, like the one at Tijuana, send a plane for the beasts. Bulls being shipped to other countries usually go by air. *La Punta* bulls have been flown to such far away places as Caracas, Venezuela, and Lima, Peru. Regardless of the means of shipment or the destination, the loading technique is the same.

On the day of shipment, the buckaroo's best friend is the trained ox which serves as a Judas goat. These phlegmatic oxen are disciplined and calm, they will not become panicky during corralling, and they soothe and calm the bulls. Each year a half dozen young oxen, raised on the ranch, are added to the herd to learn this specialized work.

The bulls leave the few fenced acres in which they have lived since weaning with all of the sweet temper and good grace that might be shown by a tiger being dragged from the jungle. Six or seven cowboys and an equal number of oxen round them up and start herding them across the ranch to the loading enclosure. They are usually aided by Don Pepe in his jeep, which he handles as though it were some unusually maneuverable sort of horse. Everything goes smoothly as long as the bulls and oxen can be kept in a bunch. Occasionally, however, a bull will break away from the herd and take his stand alone. These animals were tested as two-year-olds to make sure that they would refuse to be prodded into going to a familiar pasture. Now they are two years older and are being driven away from their home. When they break from the herd, trouble can start.

"That's when he will fight," explains Don Pepe; "when he finds himself alone. It's in him to fight the way it's in a racehorse to run his best when he is pitted against other horses on the track."

When a rebel breaks from the herd the men stay clear of him until they can sur-

(Continued on page 104)

THE FIGHTING BULL (above) follows the oxen into the loading chute. The oxen go out by a side door; the bull will be boxed in a stout crate for shipping.

THE BULL IS TESTED (upper left) when he is a two-year-old. This old Mercedes racer was used as the first step in mechanizing the test; today a jeep is used.

CALF TO

COW TO CALF

How to feed the calf, the expectant heifer, the fresh cow.

The best way to replace a faithful old cow who has served her time in a herd is to start out with a good calf; and the best way to get a good calf is to start out with a good cow. So the production of good cows becomes a closed circle and not many herdsmen will want to say which is the most important.

Let's take the heifer calf at birth and follow her around the circle.

The Calf

A farmer usually has better judgment than a cow about the best place to drop her calf. In winter, or in early spring and late fall when there is likely to be cold or rainy nights, the blessed event should take place in a warm box stall, a place where you yourself wouldn't mind taking a snooze on a rainy afternoon, clean, free of drafts, and knee-deep in straw.

In the summer and early fall, the pasture or a grass lot near the barn will please the cow. This is more natural for the cow, and if she is the nervous or jittery type she'd rather be alone. Two or three days before the date for her calf she should be checked several times a day, especially if it is her first calf. A cow in good condition seldom has trouble, but if trouble does come, it's a good idea to be on hand to nip it in the bud. If the cow is in labor more than six or seven hours and there's still no sign of the calf, she is likely going to have trouble and will need help. The calf sometimes starts out backward, feet first. When this happens, a veterinarian should take charge of the situation unless you're an old, experienced hand. He will either turn the calf or help it out. In many cases long labor means the calf is dead and help is needed to save the cow.

If the calf is born according to the book and the cow is everything a mother should be, she will take charge of the situation; in fact, she would rather not have the farmer around. She will lick the calf dry and clean it up. Then all the farmer need do is to give the navel a dab of iodine, and the calf is on its way.

Sometimes a cow will be touchy about owning her calf. She just doesn't want children. If this happens the farmer has to be the midwife; the calf should be wiped dry with a feed sack and any mucus or membrane that might interfere with breathing removed from the mouth and nostrils. If the udder is dirty, wash it off with soap and warm water.

It may take a lot of patience and perhaps some cussing to persuade the unnatural mother to accept her offspring. Tie her up and after you get the calf on its feet, guide it to the udder. It will do the natural thing. Once it starts sucking, the cow will usually calm down. Unless she is dead set against motherhood she will gradually warm up to the calf.

When the cow and calf are getting along happily together, take the afterbirth out and bury it. Otherwise the cow may eat it, and being a hay burner and not a meat eater, she may get an upset stomach from the undigested parts. If she can't throw up she may have complications. Apparently the afterbirth supplies something the cow needs, or is an instinctive act done to remove all traces of the birth. This might have been an act of survival when the cow was an animal of the wild and there were predatory animals about looking for a veal dinner.

Within an hour after birth the normal calf will get up and wobble to the dining room. It knows what is good for it—the first milk, or colostrum. Colostrum milk is a thick, rich, creamy milk that contains 10 times as much vitamin A, three times as much riboflavin, and six times as much protein as ordinary milk. It is laxative and washes out the intestinal tract. Antibodies in colostrum milk build the calf's resistance to scours, colds and pneumonia.

If the calf is weak or isn't interested, give it a hand. Straddle it and guide it to the udder. Wiggling the teat around its mouth, with a squirt or two of milk, will usually make it want more.

The calf should be left with the cow for two or three days, until it gets all the colostrum. Then it is taken away and placed in a clean pen and the cow goes back to the herd to start making money. The calf will cry for its mama and the cow will bawl for her calf, but sleep on the off side of the house and in a day or two they'll forget about each other.

Now the calf is ready for dry calf starter feed and milk. There are any number of good starters on the market. Some dairymen who haven't time to measure out the ration twice a day dump some starter into a large metal feed can and let the calf nibble away at it until it's gone. If it is shy about eating a dry feed, show it how good it is by giving it a mouthful by hand; be patient; a good swift kick can kill a calf.

The milk should preferably be from the mother, but if you have several calves the bookkeeping might be too much trouble; give it herd milk warmed to body temperature. Keeping the milk warm in cold weather is a problem if the calf is a slow drinker. Heat it a little more; cold milk encourages scours. But the calf's water bucket is best left unheated. Give it warm water in icy weather and it will get potbellied from overdrinking.

Rich milk may encourage scours. If it's a Jersey you have, water it down a little. In England lime water is added, a pint at a feeding; the British dairyman believes this staves off scours.

Getting milk out of a pail into a calf sometimes makes a farmer wish he hadn't taken up dairying. A calf can be all-fired stubborn and you sometimes wonder how it can be so stupid. You can feed it one of two ways: 1) from a nipple pail, or 2) from a pail. The nipple pail method is easiest because the nipple faintly resembles mother's teat and the calf usually takes hold and starts to suck. The pail should be so placed that it is about the height of the cow's udder. This causes the calf to raise its head and stretch its neck, which channels the milk into the fourth stomach, where it belongs.

The other method is to give the milk from a pail set on the floor. To teach a calf, which has been a sucker all its short life, to drink from a pail is a test of character and disposition. You can sometimes fool the calf by offering the finger, immersed in the milk, in lieu of its mother's teat. After it starts sucking you may be able to withdraw your finger without the calf noticing it and it may keep on drinking. The calf, of course, will butt the bucket and slobber all over you and play hard to get for a few feedings.

A COW can feed triplet calves without trouble, but she must be in condition to produce them without harm to herself.

THE FUTURE milk cow should have plenty of first grade hay in addition to grain or commercial feed during the first winter.

THE FIRST month of a calf's life can determine its future health. These aristocratic Guernsey twins are off to a good start.

Some calf raisers believe if a calf gulps milk from an open pail set on the floor the milk spills over into the first stomach where it sours, forms a curd, and upsets digestion. Many good calves, however, have been raised by this method. Perhaps a delicate one does better on the nipple.

If milk prices are such that milk substitute can be fed at less cost, that will do just as well. Milk substitutes replace only milk, and not grain and hay. If you have several calves in the same pen and have the time, it is a good idea to tie them up after feeding them from the nipple pail. This keeps them away from the temptation of sucking each other, and if there is some hay and calf starter in front of them they'll start nibbling on this, which is good. You want capacity in your dairy cow—she has to eat a lot to milk a lot. The quicker the calf nibbles hay the better. Have it in front of her from the start.

A new-born calf should have 3 pints of milk twice a day during the first week with as much calf starter as it can be induced to eat.

Calf meal mixed with skim milk or warm water and fed as a gruel is still used by some calf raisers. This method is being replaced rapidly by the dry system of feeding, using whole milk or milk substitutes and a calf starter. Gruel feeding takes extra time because pails are harder to clean. Getting a uniform gruel mixture and feeding at the proper temperature becomes a chore and calves seem to go off feed and scour more easily. Gruel feeding is not considered as stylish as it once was.

In about two weeks the calf will do more than nibble hay. A fine-stemmed timothy and clover is better than a legume, for the latter may encourage scours. As the calf gets older legume hay can be fed, a little at a time, until it gets used to it. The calf may have to be wheedled into eating its first hay. Like any baby, it wants to put everything into its mouth, so take advantage of this and put a little hay between its lips. As the bacterial action in its rumen gathers speed, it will go for the hay without prodding. If it comes up with a well-developed paunch, that is good, for it shows it has capacity.

If the calf is eating starter and hay at 30 days it can be weaned. Taper off the milk, a little at a time. As soon as the calf is two weeks old it will begin licking at a block of mineralized salt and that will make it thirsty.

GOATS AS NURSE COWS are being used with success. A cheap goat can turn poor pasture into the best calf feed. The calf thrives on goat milk, which discourages scours.

That Old Devil Scours

Scours and diarrhea are the most common of the ailments which afflict young calves. White scours should not be confused with diarrhea. White scours are caused by an intestinal bug. If they turn up, give penicillin or sulfa, or call the veterinarian if you can't do it yourself, and pray that the calf has enough resistance to ride out the disease. Diarrhea is generally caused by unsanitary conditions. A calf has the habit of nibbling on everything in its pen, including the floor and woodwork. If these are entirely clean, no harm will come to the calf. If it has diarrhea, cut down on its liquid, give it a pint of lime water at each feeding, and keep it warm and dry. Both scours and diarrhea lower the calf's resistance and leave it open for pneumonia.

Walter Bee, of Bethel, Ohio, and a long-time, successful Jersey dairyman, has his own personal cure for scours.

"I've got a clay bank at the back of my farm," Walter says, "and I go back there and get a pan full and set it in the pen with the calf. He licks around on it and gets something that generally keeps the scours away and cleans up any that start. My cows have eaten a big hole out of that bank and they never chew the bark off the trees like they do in some places."

Walter believes there is some mineral in the clay which the animals need, although he feeds a mineralized salt.

"The trees bring up minerals too, and that's why you see the bark stripped from trees in cow pastures."

If you go to a good dairyman for advice the first and last thing he will tell you is to keep everything clean. Cleanliness not only is next to Godliness but is very important to profits. Sanitation is especially important during the first few weeks of a calf's life. She should live in a germ-free world; her pen should smell of disinfectant; she should be able to eat off her own floor. The death rate of calves is 20 per cent during the first 30 days. Sanitation is the best way to cut this down.

The Heifer

When the calf is four months old, the protein in the grain ration can be reduced to around 12 or 13 per cent. From then on, until 60 days before freshening, feed the heifer 3 to 5 pounds of feed daily along with good quality roughage or pasture. This will grow big rugged heifers ready to freshen at about two years of age, depend-

ANTI-KICK devices may be needed for the first few milkings of any heifer; after that she should stand quietly.

ing on the breed. They should grow rapidly so that feed will be used for milk production during the first milking period. If heifers are not large enough when they freshen, much of the feed goes into body growth during that first lactation. Low production during the first year often discourages the dairyman, and the heifer is sold before she has an opportunity to show she's good enough to play on the first team.

Calves born in the fall are the least trouble and expense. During the first winter they are inside and can get good care because other work is slack. By spring they are old enough to go on pasture, where they put on cheap gains and rapid growth the first summer. Along with pasture they should have a heifer-growing grain ration. During the second winter, while housed, good roughage and 3 to 5 pounds of grain per day are usually enough. They can be bred during the winter, or very early spring. As bred heifers, they make use of good pasture during the second summer. They will freshen in the fall and be ready for heavier grain feeding and high production when milk prices are highest. Then when they go on pasture in the spring, their production jumps back about to what it was at freshening.

Calves born in the spring are too young to have pasture the first summer, for they should not have pasture until 4 months of age and preferably not until 6 months, because of their undeveloped rumens. They will not get pasture, if born in the spring, until they are a year old. These heifers freshen after having had pasture only one summer. Freshening takes place in the spring or early summer when milk prices are lowest. If a farmer has an eye for the highest profit he will breed his heifers to freshen in the fall.

Calves and heifers raised on the dry sys-

(Continue don page 123)

BARN ART

BY JAMES A. SCHWALBACH

For 37 years a Wisconsin painter has decorated barns with rural scenes because he thinks barns should have character.

FRANK ENGEBRETSON uses barn paint for barns, (top) even when painting pictures. In spare moments he paints landscapes at home, either in the kitchen or on the back porch (center). And like all artists, he stands back to admire his work (bottom).

SEPTEMBER 4, 1914 was a hot, sticky day in Green County, Wisconsin, but farmers' wagons caused a traffic jam on the County Trunk. At Jake Winn's farm, some durn fool man was up on a ladder painting pictures on Jake's barn and the people of Green County didn't want to miss it.

A raw-boned Norwegian, tanned to the collar, looked at the goings on and said, "Maybe this is what the world's comin' to. Never thought I'd live to see a man paint a picture of a Holstein on a barn. It's a wonder he don't fall off the ladder."

But Frank Engebretson, a tall, slender, easy-going barn muralist of Brodhead, Wisconsin, has been up on a ladder for 34 years painting pictures on barns; and he hasn't fallen off yet. Since that sticky September day in 1914 he has put more murals on barns than any other man alive.

He got the idea when Jake Winn asked him to paint the barn.

"I wouldn't mind painting your barn, Jake, if I could paint a picture on it. I don't see any sense in having all barns look alike."

"Paint a picture on it, Frank," Winn said, "and we'll see how folks like it."

The neighbors thought it was a mighty fine idea; and since that day, Frank Engebretson has painted over 100 murals in Green and LaFayette Counties in southwestern Wisconsin. There isn't another place in the world that boasts of such barn art. These murals have drawn visitors from all over for they are unique in art, and agriculture.

"There's a lot of money in those Wisconsin hills," said one traveling salesman. "Why, the farmers are so rich they even paint pictures on their barns."

The Swiss and Norwegian farmers who settled this region a hundred years ago didn't know much about barn art, but they knew about raising dairy cows. They made money at it, too. Frank Engebretson's father owned one of these farms, and he wanted his son to follow him. "Painting pictures is no profession, Frank; get out and get yourself a man's job." But even then the young artist had his own idea. When he walked barefoot down the dirt road to school, he didn't see a dollar sign in the Holsteins pasturing along the roadside; he saw them on a canvass. Instead of studying the Declaration of Independence in history class he drew pictures of the men in white wigs who signed it. His teacher brought him art materials and drawing board, and encouraged him to paint what he saw around him, and not to copy from others.

He was graduated from eighth grade and apprenticed himself to a house painter. Two years later he was out on his own, and from that day to this he has made his living at interior decorating and house painting. Barn murals are the self-taught hobby which has made him famous.

Pictures like the one on the E. A. Chapman barn at Wiota, Wisconsin, have built his fame. It covers an entire side of the barn, 150 by 18 feet, and shows a typical rural scene with horses and cattle grazing by a stream. He painted this mural in 1925; ten years later Mr. Chapman hired him to repaint all the farm buildings including the mural. Engebretson climbed up on his ladder (he fell off a scaffolding once and hasn't used one since), and in less than two days had the mural looking as good as new. He didn't even charge extra for this service, but threw it in for good measure.

Most of his barn murals, like the Chapman picture, are of rural scenes: a winding river, horses nosing the pasture, cows browsing on a hillside.

"Most people seem to like tradition. They don't go in for these modern subjects," says Engebretson.

But the picture he put on Fred Jensen's barn, north of Wiota, Wisconsin, is a modern one showing the progress of science. A giant span of bridge frames a super highway with speeding cars and a plane high above the road. It's the only airplane he ever put in a mural and he's not especially proud of it. He doesn't think airplanes belong in barnyards. He prefers to paint landscapes, any kind of landscapes, even the Swiss Alps.

A Swiss farmer, longing for his native soil, called Engebretson one day and asked him to paint a mountain scene on the side of his barn. When the artist arrived,

"IN THE ROCKIES" is considered by Engebretson to be his finest work. The average length of his murals is about 40 feet, but one giant scene was 150 feet long. Because he likes to work near home in Wisconsin, his art is limited to two counties.

he found the farmer with a picture postcard of the Alps in his hand.

Engebretson nodded, blocked out his scene on the barn, and started to work. But his client was not satisfied; the Alps on the barn didn't have the right curves, one was too tall, one too small; all the bumps were in the wrong place. While the homesick Swiss directed him, Engebretson improved the postcard artist's impression of the Alps.

SOME OF THE LAST HORSES in Green County are in Engebretson's paintings.

He remembers well the time he was commissioned to paint a herd of Holsteins grazing on a hillside.

"I'd finished the mural and thought I'd done a pretty good job. But my client didn't agree. He just looked at the mural, and looked at me and said, 'Don't you know, Frank, that Holstein cows have white legs, not black?' I've put white legs on every Holstein I've painted since."

Engebretson thinks his barn mural, entitled "In the Rockies" is his finest. A sparkling lake is overshadowed by the towering, wooded mountains.

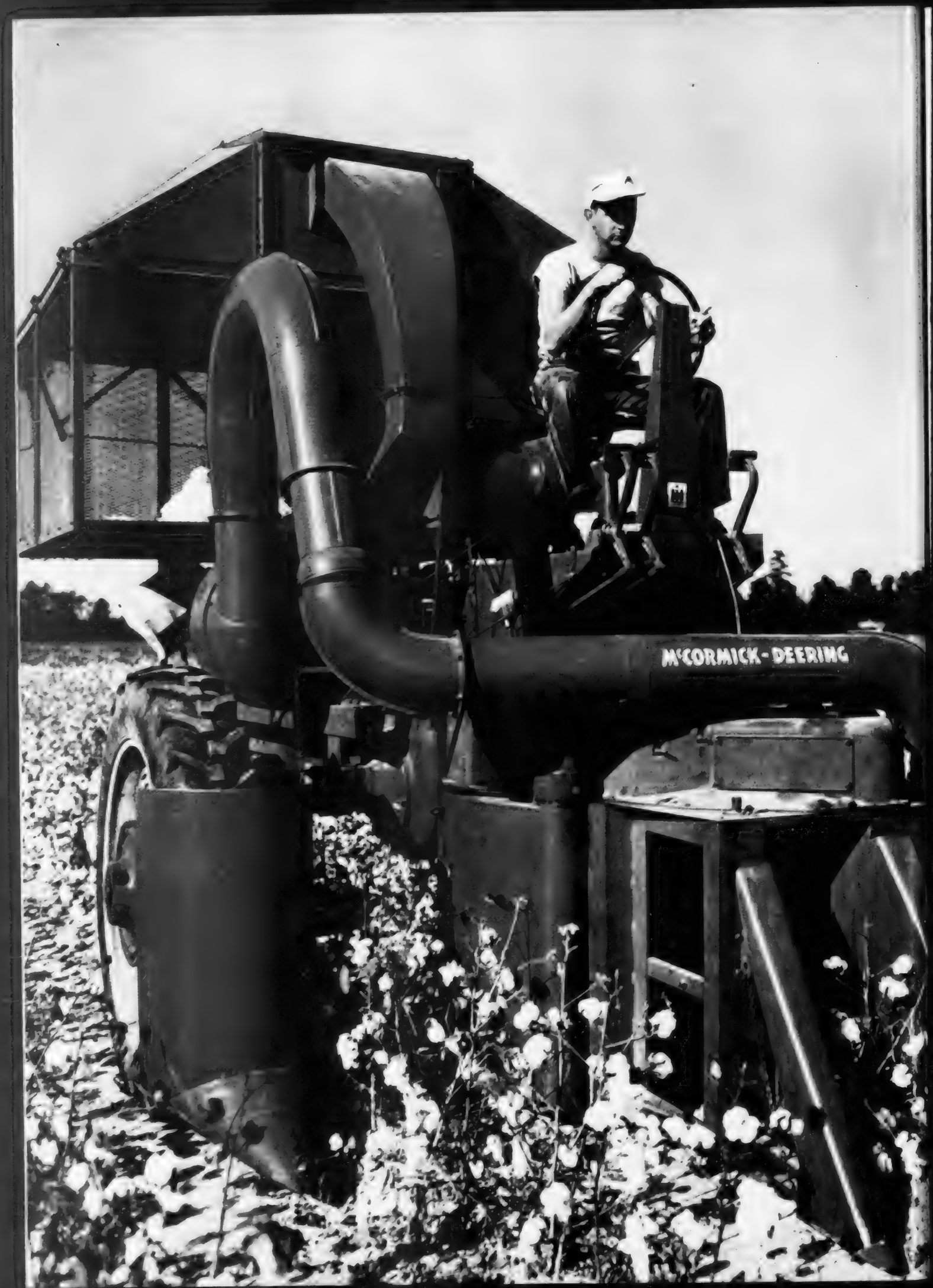
"I'll probably never do a better mural," he says. "People come again and again to see it. When they do that, you know you have something fundamental."

His murals average about 40 feet in length. The 150-foot mural on the Chapman barn is his all-time high. And the price? Well, that all depends on the farmer's income. The more money he makes, the more he pays for his barn art. Engebretson used to charge by the running foot; a picture a hundred feet long would cost $100. But that was before inflation snowballed the countryside. His prices have gone up, too, and a barn mural is worth three times as much as it used to be. But farmers interested in art, don't quibble about prices: Engebretson hasn't had an unpaid bill yet, and he has painted more than two miles of murals.

But a farmer wouldn't feel right owing Frank Engebretson money. He's unassuming about his work; he didn't even know that a picture of one of his barn murals was in a national encyclopedia until a friend told him. Then he promptly forgot about it.

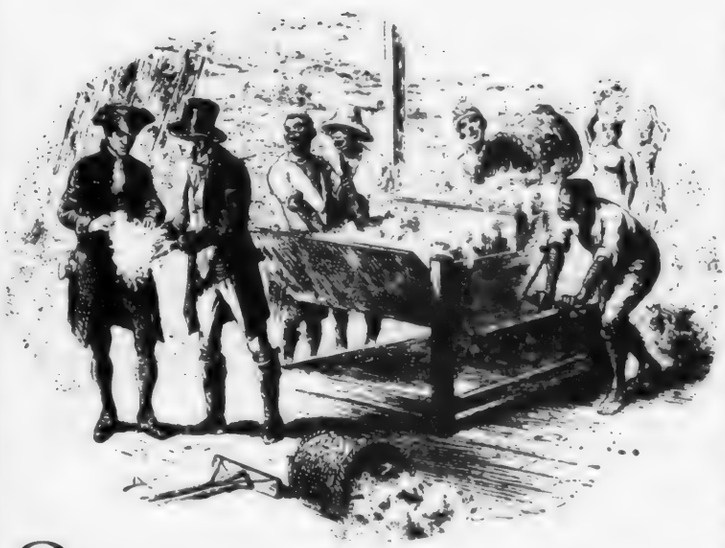
Engebretson's technique in art is as clean cut as his Norwegian jawbone. Usually artists spend a lot of time mixing just the

(Continued on page 135)


McCORMICK-DEERING

BY GEORGE LAYCOCK

REVOLUTION in the cotton fields



Old Jim Hill spoke softly to his mule, and the mule stopped. "Don't have to talk loud to get him to stop," Hill said. "Reckon mules don't like workin' in cotton as much as I do."

Hill has worked in the cotton fields around Auburn, Alabama, since he was a sharecropper's boy at home, 60 years ago. He is among those cotton farmers who have heard that their favorite crop is being hit by an industrial revolution, but who are still unwilling or unable to change from mules to tractors, from hand dusters to airplanes, and from hand picking to mechanical harvesters.

"I suppose some farmers have to get tractors," he says, "but I wouldn't lay that old mule aside for any money. I like mules much as I like cotton. Look at that cotton. It's coming on. A fellow can tell when it's doing right. Makes him feel good. Yes, sir. there'll be cotton all right. If we don't grow no cotton, we'd go naked."

Hill, a tall, slender, bespectacled, gray haired negro, owns his own land, 135 acres of it and has since 1927. "No more halfin' for me," he says. "That's the way I got my start—halfin', but it's no good; raise a crop of cotton and give half of it away. Some years you don't do too well when you get the whole crop. It'll do good this year though, real good. Ole mule and me'll take this cultivator through here a couple of times, then once with the sweeps before we lay it by. Then there's the weevil. Oh, don't worry about the weevil, he's down there all right, down there waitin' for a job. Then's time to poison. We do that with mules, too, and, of course, we pick the cotton by hand. Keeps everybody busy most the time."

Hill's way of cotton growing belongs to the past. There is a revolution underway in the cotton fields. Machines are doing jobs that men and mules have always done and cotton people are thinking up new ways to mechanize every cotton field chore. In California, new developments have already enabled farmers to harvest yields that are three times the national average.

In such research centers as the big Delta Branch Experiment Station in the fertile flat fields of western Mississippi, crews of agriculturalists are busy developing new ways to prepare cotton land for planting, seeding, thining, cultivating, weed control, insect control, defoliation and harvesting. "The changes are coming so fast," says cotton economist Grady B. Crowe at the Delta Station, "that while since the early 1930's there has been a 35 to 40 per cent reduction in the number of acres being planted to cotton in the cotton belt, we're still producing as much cotton as we did before acreages were cut. If we continue to mechanize and develop new methods of fighting insects and weeds, we can grow still more coton on less land."

There is no one thing responsible for the increased yields of cotton. It is not better insect control alone any more than it is better planting, weed control, harvesting or gining. It is a

HAND PICKERS (right) still harvest most of the cotton crop, but they work in the lengthening shadow of the giant mechanical pickers (left). Mechanical harvesters find their best use in the large plantations of the Southwest and the Mississippi Delta area. A mechanical picker can pick as much cotton in a day as 70 to 80 men picking by hand.

NEARLY ALL cotton field tasks are now mechanized. Planters (left) plant seed from which lint has been removed by acids. Flame cultivation (center) is widely used for weed control. Airplanes (right) fight the boll weevil, spread defoliants.

combination of all these for there are specialists working on each phase and on each they are making progress.

The demand for cotton today is greater than at any time in history. Some cotton experts feared that the synthetic fibers such as rayon, orlon and nylon would cut into the cotton demands, but their fears were unfounded. Laboratories are turning up a constant supply of new uses for cotton, jobs ranging from linoleum and photographic film to plastics and margarine. As far as anyone can see into the future cotton has a firm grip on its position as our most important crop. One of every four farms in the country grow the cotton which we turn into ten billion yards of cloth annually.

Farewell to the Mule

The present revolution in the cotton field had its start in the early 1940's. The war created a demand for more cotton than farmers had ever grown. It also promised them better prices than their crops had ever earned before. In the ten-year period from 1930 to 1940 the price paid the farmer averaged about 10 cents a pound. In 1943 it was almost twice as high, and by 1950 cotton was selling at 37 cents. Coupled with these was the fact that the same war drained their farms of labor and left them looking for ways to grow more cotton with less help. It was this set of circumstances that brought the tractor to the cotton farm—and the tractor rapidly became as much a part of cotton farming as the boll weevil. The old dependable mule, regardless of the hangers-on like Jim Hill, is a doomed beast, for his burden has been taken from him. Most cotton land is now tractor farmed. The number of tractors used on cotton farms increased 187 per cent from 1940 to 1950. In Texas and Oklahoma 82 per cent of all cotton is cultivated with tractors.

Nor do the bulk of southern farmers and plantation owners mourn the mules' passing. Sam Engelhart, who owns a 1200-acre plantation at Shorter, Alabama, says, "We used to have from 25 to 30 mules on the place all the time. Now we have only two and they're just kept around to haul wood for the tenants. We've replaced our mules with six tractors." Englehart is typical of the progressive southerner who tempers his sentimental approach to cotton with a practical outlook. "All mules look the same to me," he says. "I never could love 'em."

Englehart's plantation has been in his family for four generations and cotton has always been the major crop. He has increased his fertilizer application from 400 to 900 pounds to the acre and like many farmers throughout the South has switched to liquid ammonia fertilizer to supply the nitrogen needs of his cotton. About half of the farm is growing cotton now, and the other 600 acres are devoted to legumes, corn, soybeans, and beef cattle. In addition to these enterprises Englehart owns a new cotton gin where cotton farmers for miles around bring their cotton for ginning.

Like many southern farmers Englehart is diversifying his farm enterprise. "There is a good reason," he says. "Cotton isn't dependable." If the season is too dry or the boll weevil is especially hungry, yields drop. Then, too, prices fluctuate rapidly and the larger mechanized farms throughout the South are edging into other enterprises along with cotton to cushion the shock of bad cotton years.

The upsurge in the tractor population fits this trend well, for most of the tractor attachments used for cotton can also be used on other crops, especially the row crops, such as corn and soybeans.

And as the tractor began to take its place on the cotton plantation a whole new group of machines came along to help it. New four-row cultivators have replaced the old mule drawn one row and one half-row plows. Tractor mounted seeders and fertilizer attachments are as familiar in the Cotton Belt as in the Corn Belt. The stalk chopper developed for making mulch of dead corn stalks has also been adapted to the cotton fields, where it chews the stalks of the harvested cotton up and spits them out on the ground as a mulch.

As any sharecropper will admit, one of the biggest jobs in cotton farming is the "chopping" or thinning, for there has never been a fool-proof plan devised to guarantee the farmer cotton plants where he wants them. Field hands have always had to go through the fields when the cotton is a few inches high taking a row at a time and chopping out the excess plants to leave two or three in each hill. The hills are about a foot apart. Now newly developed two and four row mechanical choppers can chop cotton at three miles an hour.

Some farmers, including Sam Englehart, are starting to use the new hill droppers in an effort to place the seed where the cotton should grow and thus eliminate some of the chopping. "It will still have to be gone through by hand," says Englehart, and the scientists agree, "because even if we know the rate of germination the weather will have an effect on the stand we'll get, and we'll still have to plant it thicker than it should grow."

Still other farmers are planting cotton in solid rows and depending on cross cultivation to dig out the extra plants. At any rate, farmers and research people agree that chopping is no longer a barrier to complete mechanization in the cotton fields.

Cotton Pickers Coming

Nor is harvesting the last barrier to mechanization. Gradually the bugs are being worked out of mechanical pickers and especially on the larger farms these machines are at work relieving the hand pickers of their back-bending labor. The mechanical picker has met its greatest success to date in the large plantations of the Mississippi Delta and in the western states. Southeastern farmers, for the most part are still picking their cotton by hand. Cotton specialists feel that farmers with less than 100 acres of cotton can not afford a picker.

Among the early inventors of cotton pickers were Angus Campbell, Charles Berry, International Harvester, and the brothers John and Mack Rust of Mississippi. Like the creator of Frankenstein, the Rust brothers were frightened by the monster they had built. They built their mechanical harvester in the early thirties and in the heart of the depression years when labor was a drug on the market and people throughout the country had little money in their pockets. The Rust brothers

TRACTOR MOUNTED DUSTERS (left) speed up the DDT and aldrin spreading campaigns against the boll weevil. Better cotton gins (center) promise cleaner lint cotton. Country gins (right) cost $150,000, but are being built in increasing numbers.

had a deep seated conviction that to place their machine on the market would aggravate the depression by taking work from still more people.

But mechanization refused to be haltered and in the following decade hundreds of new patents were issued on cotton picking machinery. The war and its demand for cotton brought the mechanical picker into demand. The Rust brothers, incidentally, are back in the machinery business marketing a cotton picker.

Sam Englehart says, "I had a picker, but I sold it and went back to hand picking. A farmer from Arizona bought it. I wouldn't say I'll never have another one, but first they'll have to make one that picks cleaner cotton." Mechanical pickers turn in a trashier cotton than good hand pickers and the gins have trouble removing the broken stems and bolls. The lint is often graded down on the market.

The price of a mechanical picker (about $8500) makes it a tool for the big farm. It is a heavy machine that can't be easily maneuvered on small uneven fields, on steep land or in wet fields.

Some of the agricultural engineers working on the cotton harvesting problem in the South feel that the answer to these questions, both the cost and the maneuverability, lies in the development of a good cotton stripper. Pickers gather only the lint and seed while strippers harvest the boll as well. Consequently, strippers send trashier cotton to the gin. Work is

THE MULE MAY NOT CARE, but his days in the cotton field are numbered. His last stand is the small farm of the Southeast.

underway to develop both strippers and pickers that harvest cleaner cotton. If the trash problem can be solved either in the harvester or the gin, the stripper (which sells for about $1000) may become increasingly popular.

It was the stripper that first started to take the hand work out of cotton picking. The first stripper was made in Texas in 1914 when a farmer in the northwestern part of the state fixed a couple of sections of picket fence on the front of a sled. Each section advanced down a cotton row as a team pulled the sled. The cotton bolls snapped off and were pulled into the sled. Sled strippers are rapidly being replaced by tractor mounted two row strippers on which the cotton bolls are caught in a revolving auger, snapped off and carried into a bin or an elevator that dumps them into a trailer.

Mechanical harvesters set farmers and research people to looking for methods of producing cleaner cotton and the research men came up with an idea brand new for the cotton farmer. To keep the leaves from getting into the seed cotton at picking time they sought out ways to clean the leaves from the plants before the pickers got into the field. Now calcium cyanamide is widely used for this defoliation wherever machine picking is practiced. Farmers have found that the defoliant should be spread in the early morning when the leaves are covered with dew. Moisture helps hold the chemical in place until it causes the leaf to wither and drop off. Defoliants are generally spread from airplanes.

In Mississippi alone there are 22 air bases from which single engine planes fan out over the cotton plantation throughout the summer. Their big job, however, is insect control for insects have retained their unpopular place at the top of the cotton farmers list of pests and troubles.

King of the cotton insects is the boll weevil, a tropical pest originally, but one which is doing nicely for himself now as far north as Tennessee. He is a grayish or brownish insect a quarter of an inch long and equipped with a long snout tipped with chewing jaws. He depends almost entirely on the cotton plant for food and is always hungry. The flower buds which the cotton farmer calls "squares" are his choice food. In these buds the female weevil also lays her eggs which hatch, after three days, into tiny white grubs. The grubs eat and grow until they enter the inactive pupae stage and finally change within a few days to adults ready to chew their way into the outside world and help repopulate it with more of their kind. The whole life cycle takes about two to three weeks and because there are several generations each year the farmer dusts or sprays at brief intervals throughout the summer. It is common practice for a cotton farmer to poison for weevils 6 to 10 times during the growing season. This costs him about two dollars an acre for each application

Both dusts and sprays are being applied by airplanes and one of the most popular insecticides for the job at the moment in Mississippi is Aldrin or a mixture of Aldrin and DDT. Farmers in other sections of the Cotton Belt prefer Toxaphene or BHC-DDT. In the Mississippi Delta, according to Dr. E. W. Dunnam, Entomologist at the Delta Branch Experiment Station, dusts are becoming less popular than sprays, because sprays can be applied under wider variations in weather and the planes can buzz the field 10 or 12 feet above the ground, while dusting requires the pilot to keep his wheels just high enough to miss the cotton.

In addition to insects, the cotton farmer must do constant battle with weeds, and weed control is the last barrier to complete mechanization of cotton farming.

Most cotton farmers have found no substitute for the cultivator and the hand hoe in fighting weeds. In addition to the once over at chopping time, hand laborers generally make two more trips through the field to cut weeds. The research people are busy with both machines and chemicals in an effort to relieve the field laborers of this job, too. Rotary hoes and spring tooth weeders are kicking out the small weeds and grass when the cotton is still small.

In 1945 Price McLemore of Alabama built a field sized flame thrower to burn weeds out of the cotton fields. Farmers became enthusiastic about flame cultivation. But it wasn't the cure-all they expected it to be; it demanded careful manipulation to keep from burning the cotton, and the machinery was clumsy. A lot of farmers gave the idea up as a flop, but because of new and better equipment flame cultivation is on its way back.

A newly developed burner that throws a shorter flame, one which won't bounce off clods as readily and scorch growing cotton, is contributing to his new popularity. The present flame cultivators burn propane or butane gas instead of the fuel oils used under pressure in the early models. The new burner allows cotton to be safely flamed at younger ages.

Flame, however, won't do the job by itself. But in combination with new chemical herbicides it is gradually helping eliminate the hoe.

One Delta Branch Experiment Station test aimed at this end worked as follows. The tractor on which the seeder was mounted also carried tanks and nozzles to apply a selective weed spray at the time of planting. These sprays, applied before the plant emerges, either penta-chlorophenyol or di-nitro-ortho-secondary beutyl phenol, control weeds for two to six weeks after planting.

Then the fields were treated with a post-emergence spray, an oil similar to dry cleaning fluid which does no damage if it doesn't strike cotton more than one inch above the ground. A special shoe beneath each nozzle slides along the ground keeping the nozzle one inch above the surface. This can be used for two or three sprays or until the bark on the cotton plants starts to crack. After that the weeds are kept under control with the flame cultivator which covers the fields five times during the summer.

When the time required for treating these tests acres was computed the scientists found that by eliminating hand chopping and hoeing they had cut the time per acre from 54 hours to eight. The mule using farmer with half-row plows spends 160 hours growing an acre of cotton.

And while engineers are busy making new machines for the cotton fields, the plant breeders are equally busy selecting and breeding new varieties. Verticilian wilt is spreading through the cotton belt and many farmers have lost as much as 20 per cent of their crop to the wilt. Now the plant breeders are looking for wilt resistant strains and a few good ones, which do well in the Southwest, have already been found. South Carolina scientists have been breeding cotton plants resistant to fusarium wilt with considerable success for the past 40 years.

Plant scientists are also developing strains of cotton which will clean better at the gins. The cotton leaves normally are covered with dozens of tiny hooks which

(Continued on page 80)

TWO ROW STRIPPERS do a fast job picking boll and all, cost $1,000.

PICKIN' COTTON is hard work, but the evening ride to the gin is quiet and restful. The cotton makes a soft mattress and the mules go slow enough to give a man time to think about "hush puppies" and grits for supper, and forget an aching back.

MILK FEVER

BY DR. J. M. BAILEY

Not long ago a farmer called me to come out quick to see his cow. She had just freshened, he said, and was droopy and sick. He hadn't exaggerated, for the cow was stretched out and we had to look twice before we could be sure that she was still alive. All the symptoms showed she had milk fever. Her recovery was almost miraculous after she was treated.

By the time a pint of solution had been emptied into her jugular vein, the cow raised her head and sat up. Her eyes brightened and she began to take an interest in what was going on. Within an hour she was on her feet and had gone to work on a pile of hay as though nothing had been wrong. The owner watched her rapid improvement with amazement and relief. Finally he said, "You know, I'll bet that's what my neighbor's cow had last winter. She looked so bad that he took his shotgun and killed her."

It's easy to understand how that might happen, for cows with milk fever can really look like goners, and this isn't surprising. Calcium is absolutely essential for life, and milk fever is due to a shortage of calcium in the blood. Lacking calcium, all body activities are affected, especially those closely related to the brain and nerves. While the experts agree this shortage of calcium exists, they don't all agree on the exact cause of it.

For a while it was believed that sudden coming into milk was responsible for a dangerous lowering of calcium in the blood. This was all right in theory, for the first milk or colostrum of a fresh cow is mighty rich in calcium. However, this was much too simple an explanation, for it would have meant that every high-producing cow should have milk fever when she freshened. Since this lacked quite a bit of being supported by facts, it was finally decided that the parathyroid glands might be mixed up some way in the deal.

These are the glands which regulate the use of calcium in the body. Nowadays it's fairly fashionable to believe that milk fever is tied up in some way to disturbed functioning of the parathyroids. Such a theory is more than half-way logical, too.

The physiologists tell us that a cow

starts secreting milk shortly before calving time. In doing so she also starts drawing calcium from her blood to put in it. Under normal conditions the parathyroids make it possible to replace the lost calcium with some that is drawn from the bones. When this sort of a trade is made, the cow doesn't get milk fever, for the bones are generally able to supply big orders of calcium. Things are a lot different when parathyroids get out of whack and stop working.

Calcium would probably continue to be drawn from the blood as usual at freshening time; but with no regulator on the job, it's possible that even larger amounts than usual might be put in the colostrum. Trouble would really start, though, when it came time to get more calcium from the bones. With the parathyroids off duty, the reserve supply would be unavailable, and milk fever is in the offing.

Maybe this explanation isn't the correct one at all. However, it's about the most logical one available right now, so we'll believe it until a better one comes along. Regardless of the basic cause, the symptoms of milk fever follow a fairly definite pattern.

Attacks are usually seen either shortly before or after calving. There is a complete loss of appetite, and refusal to eat may be the first sign of trouble noticed by an owner. Affected animals are apt to be unsteady on their feet and in the early stages they stand in one place as if they are thinking about some deep problem. Once in a while, they act crazy, bellowing and cutting all kinds of fancy didoes. They may have convulsions and fits with frothing at the mouth.

Whatever the early symptoms may be, cows eventually go down and are unable to get up again. This indicates the gradual spread of paralysis and loss of consciousness due to affliction of the nervous system. The head of a "downer" cow is often turned around into the flank in a position which every veterinarian recognizes as characteristic of milk fever. At other times the head isn't actually turned to the side, but the neck is bent in an S-shaped kink. Bloating is not uncommon and bowel movements are prevented by paralysis, so that the animals appear constipated. Strangely enough, there is no rise in temperature or fever in uncomplicated cases of milk fever. In fact, body temperatures have a tendency to be a little below normal. The longer a cow stays down, the more completely she becomes paralyzed and the poorer are her chances of recovery.

Men who have had experience with the disease aren't likely to wait for all the symptoms of milk fever to appear before suspecting it. This is illustrated by a recent 'phone call from a worried owner.

"Doc, I guess you'd better come out," he said. "One of my cows calved this afternoon and I notice she's gettin' pretty wobbly. Her eyes don't look just right, either, and I'm afraid she's coming down with milk fever."

Less experienced owners may fail to recognize the first symptoms. I know a young farmer who had a cow freshen in the forenoon. In the afternoon she laid down and he had trouble in getting her to stand up again, although he finally succeeded. She didn't look any worse by night, and he decided to wait and see how she was in the morning before calling a veterinarian. The next day was too late, for the cow died of milk fever sometime during the night. Uncertainty about suspicious symptoms means that an early diagnosis is highly important.

One of the few things about the disease veterinarians are sure of is that it won't affect bulls and steers. At various times it has been observed in all of the dairy breeds, at all times of the year and under all kinds of conditions. We used to be told that only good cows could have milk fever, but now they're saying that poor ones can have it, too.

I have never seen a low producing cow that suffered from uncomplicated milk fever. I have seen such animals that unquestionably had milk fever in connection with septic mastitis and others that had it with pneumonia and infection of the uterus. In such cases the milk fever is secondary. I have also seen poor producing cows that had grass tetany, a disease of the pasture season which even attacks young stock and dry cows. The symptoms may sometimes be confused with those of milk fever. On the other hand, it could be that poor producing cows really do have milk fever at times.

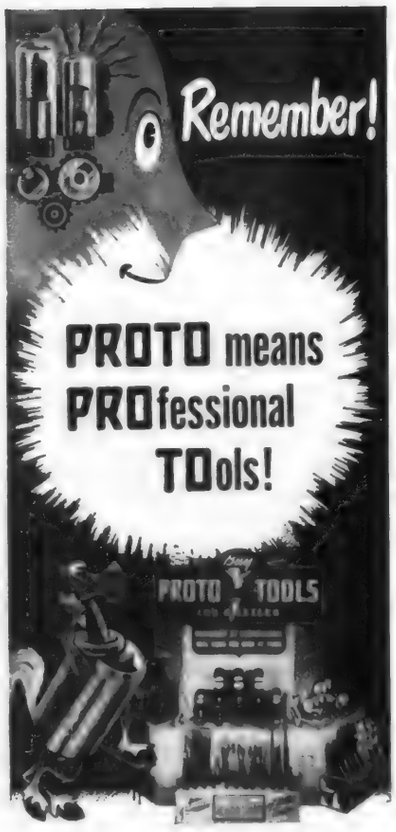
A somewhat similar question is raised in regard to the age at which cows are affected, for it has been claimed that young animals never have milk fever. Evidently all the research workers don't know this, for first-calf heifers have been definitely reported with the disease.

It is well known that heifers frequently have acetonemia, and it is possible that it has sometimes been confused with milk fever when it appeared in younger animals. However, it sometimes happens that laboratory examination of blood and urine shows both diseases in the same animal. Consequently, it may be quite a job to tell which is which in a given case. It seems likely that mistakes have been made both in regard to the poor-producing cows and the heifers. In all fairness it must be said that such errors are possible both in regard to beliefs regarding milk fever and the diagnosis of actual cases.

(Continued on page 112)

A CALCIUM GLUCONATE solution given ▶ through the jugular vein brings most stricken cows to their feet. In the rare, stubborn case when this fails the udder may be pumped up to stop milk flow.

◀ PARALYSIS is a symptom of milk fever. A cow with milk fever has no fever.



That Power Sockorse pose is a reminder to remember that PROTO signifies highest professional standards. PROTO tools are light but strong, balanced, easy handling, snug fitting. They're properly forged from special steels and scientifically heat treated to impart extra strength, toughness and life! Buy PROTO tools from your dealer's big selection, while still obtainable. Send 10¢ for 68-page catalog to

PLOMB TOOL COMPANY

2266J Santa Fe Avenue
Los Angeles 54, Calif.

TOOLAGRAM
Diagonal Cutter
Needle Nose
These PROTO pliers are sturdily constructed from rich alloy steels, and have good balance, solid joints, full polish and induction-hardened cutters.
5184
PROTO TOOLS
LOS ANGELES

REVOLUTION IN THE COTTON FIELDS

(Continued from page 76)

catch the lint, making ginning more difficult. Consequently there is a search underway for cotton plants with smooth leaves.

Plant breeders are cutting their waiting time between generations of cotton in half. They grow two generations a year instead of one by sending the seed of new strains to an experiment station south of Mexico City. Here another crop is grown during the winter and the seed from it is shipped back to Mississippi for planting again in the spring.

There are Changes in the South

Cotton is moving west. The Southeast is losing its standing in cotton farming to the Southwest. Southeastern farms, plagued by increasing erosion and loss of fertility, are being switched more and more to grass farming and livestock. And grass is treating many of them better than cotton did. In California, on the other hand, fields are bigger and flatter and more suitable for the new cotton growing machinery that has come into the scene. California farmers are irrigating their cotton and producing three times the national average of lint per acre. Some of the better California growers produce three 500-pound bales of lint to the acre while a bale per acre is high in Alabama. Cotton sold last year at about 40 cents a pound or $200 for a 500-pound bale, and the seed brought farmers another $40 to $50 an acre.

The migration of cotton and the replacement of labor by machines are being felt among the field hands of the Old South who have planted, cultivated and picked the cotton since colonial times. There was fear in the early stages of cotton mechanization that the Rust brothers were right, that cotton machinery would work widespread hardships on the sharecroppers and the wage workers. They couldn't foresee the effect of the defense plants and the increased demand for factory produced goods which provided city work for the farm hands. And because the farmer has not mechanized all his cotton jobs at one time the shock has not been abrupt. The farmer still combines his machines with some hand labor.

Whether or not the field hands want to leave the cotton fields for jobs in town is another question. Southern farm people, whether they are plantation owners or sharecroppers, like cotton, they like to see it grow, and they like to see it picked.

As Frank Finney, a farm renter and a neighbor of Jim Hill's said, "They don't go to town because they want to. They have to. There's been many and many a good farm taken away by this grass farming. Grass farming's no good unless you own the land because it takes work away from a man and his family. I grow 17 acres of cotton here, rent the land. It costs me a bale of cotton to the plow (his annual rent is a bale of cotton for the farm) and if this farm was put in grass there wouldn't be no work for me. I reckon I would like to have a tractor, sure would. but I'd get it this year and maybe lose it next."

Back down the road Jim Hill who hopes to spend out his life in his cotton fields says, "Things are changin' all right. They've got machines for this an' that. They've got machines for plantin' and machines for choppin' and machines for weedin' and machines for poisonin' and machines for pickin'. I guess I'll get along without 'em for a while.

"Come on Mule."

PLAIN PEOPLE

(Continued from page 61)

such conveniences as a 20 cubic foot frozen food locker, two tractors and two automobiles, a Lincoln and a Mercury—and he farms on the halves.

"Things have changed," Dave says. "We used to travel in a trottin' buggy: now it's cars. Now John sells the milk from his 12 Holsteins at the farm. We used to separate and sell butter on the market in Coatsville. Then we'd feed the skim milk to the pigs, for we butchered 30 hogs a year to sell on market.

"There was always work to do. In winter we'd drive the trottin' buggy down to the woods and cut fire wood all day. We liked to work then. I worked hard even when I was a little boy, maybe too hard before I was strong enough for it. I think kids should learn how to work, but they shouldn't be overworked. Used to be the town kids were the skinny ones. Now some of these farmers' kids seem small and the town kids look healthy because they get the right food and they get more rest.

"The kids and everybody used to work at silo fillin' time. We'd have seven wagons and seven teams hauling in corn, and with two men to the wagon: that was 14 horses and 14 men. And, my gracious, did the women have to cook. The boys used to race all day on the wagons seeing who would haul in the most loads. Usually John set the pace.

"Still a lot of people here do it that way: do it because they don't like anything that's new. But even those who do all their work with hands and horses still seem to get their work done."

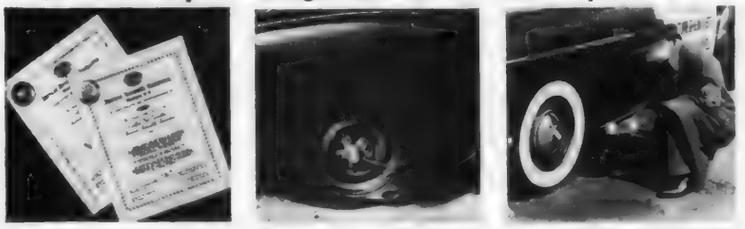
All over Lancaster County, Amish farmers seem to get their work done—if a farmer's work is ever done—and they do their job well for, like Dave Lapp, they have been at it since they were old enough to follow a team and follow what their elders taught them.

B.F.Goodrich

Three tractors disc mile-long rows on the Frank G. Boles wheat farm near Liberal, Kansas. Mr. Boles uses his tractors for all general wheat farming operations, mounts them all on B. F. Goodrich tires. During particularly heavy years, Mr. Boles hires custom cutters to help with the harvesting.

Foreman Lester Trogdon points to the king size Power-Curve cleats on the BFG tire mounted on Frank Boles' tractor—says he is "well pleased with the operation of the new Power-Curve tread." You'll agree with Mr. Trogdon when you see how these powerful tires make quick work of your tractor jobs.

Tubeless Tire protects against blowouts . . . seals punctures



Impartial tests, conducted under the supervision of the American Automobile Association (left), prove BFG Tubeless Tires protect you against punctures and blowouts. Conventional and Tubeless Tires were artificially weakened to force failure. Conventional tires collapsed instantly (center), but Tubeless Tires lost air slowly, allowing an average safe stopping distance of 3.77 miles. Driven over spike boards (right) and pierced through again and again, BFG Tubeless Tires didn't lose even one pound of air.

POWER-CURVE TIRES

"Stand up better than any other make we've used," *says Kansas farmer*

OVER 50,000 bushels of wheat in one crop have been harvested at the Frank G. Boles farm near Liberal, Kansas. Mr. Boles devotes his entire 2,720 acres to wheat and uses his tractors for such jobs as listing, discing and drilling.

Every tractor on this wheat farm rolls on B. F. Goodrich tires. Foreman Lester Trogdon explains why: "We are well pleased with the operation of the new Power-Curve tread. These Power-Curve tires are standing up better than any other make we've ever used."

Power-Curve tires give the extra wear Mr. Trogdon speaks of because the cleats are built higher—actually higher in the center than the cleats of the other two leading makes. Power-Curve cleats can be built higher because their special curve prevents bending and scrubbing in the fields.

Each king size cleat has an arrowhead nose that bites into the soil and holds . . . gives you minimum slippage even in the softest going. Because Power-Curve cleats are evenly spaced from center to shoulder, you get positive traction in reverse as well as forward.

Even though Power-Curve cleats stand rigid to bite deeper, the whole tread is flexible enough to throw dirt free as the tire rolls. This flexibility plus the open center tread mean the tire is naturally self-cleaning. That's why Power-Curve tires outpulled other leading makes in hundreds of tests throughout the country.

See this field-leading tire before you buy. You'll choose B. F. Goodrich Power-Curve tires for the savings they give you. *The B. F. Goodrich Company, Akron, Ohio.*

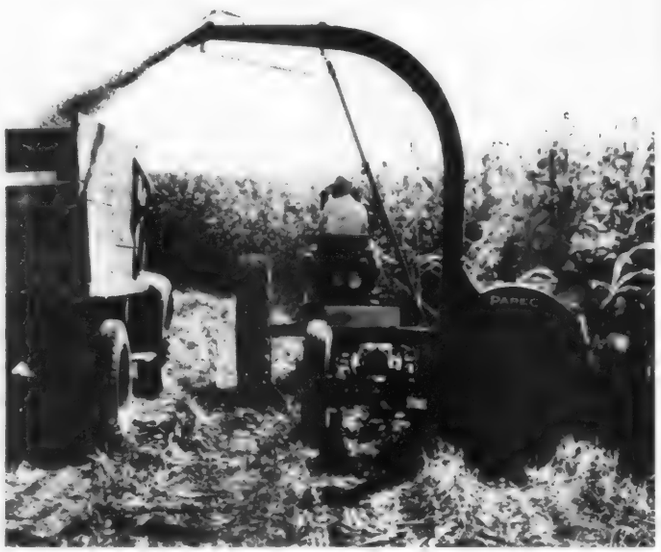
RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

PAPEC FORAGE HARVESTERS

handle

ALL FORAGE CROPS

easier, cheaper



- Full 52" width hay pickup gives large capacity.
- Adjustable axles allow harvester to operate at peak efficiency even on rough ground.
- Patented silage shelf increases capacity on row crops.
- Hay and row-crop attachments easily interchanged.
- Handles down-and-tangled crops where other harvesters fail.
- Model 151 D, with engine or power take-off, for the average farm — Model 181, with engine, for larger operations and custom work.

PAPEC HAMMER MILLS

Every Papec Hammer Mill is GUARANTEED to grind **any** dry feed to **any** desired fineness, faster and cheaper than **any** other mill in the same power class.

For complete information, see your Papec dealer or write for FREE booklets. Papec Machine Company, 119 East Main Street, Shortsville, N. Y.

PAPEC

FORAGE HARVESTERS • HAY CHOPPER—SILO FILLERS • CROP BLOWERS
HAY HARVESTERS • HAMMER MILLS • ENSILAGE CUTTERS • FEED MIXERS

FARM HOME, U.S.A.

The pretentious mansion shown above might be in a suburb of Paris, France, or on a slightly decayed residential street of any American city or town—but it is not; it is an American farm house, a gingerbread monument to an Ohio farmer who made a lot of money and wanted the "best darn house in the county."

The American countryside is heavily sprinkled with architectural monstrosities of this type, good to very poor imitations of city homes which some village carpenter planned and put up under the untutored eye of the owner. As a farm home this is about as practical as two left feet. In the setting for which it was designed, the suburbs of Paris, France, it was a thing of beauty and utility; but for an American farm it is far, far from home and must have been uncomfortable for generations of people who tried to fit their daily lives into its walls.

Farmers who have the money to build expensive houses often follow fairly definite formulas which lead to the "ribbon on a pig's tail" sort of house—they show the village contractor a picture of a house which they have seen while on a visit to friends in the city, and tell him, "Build me one just like it."

If they have small capital they take another course; they go to the village carpenter and say, "Put me up a five room house that won't cost over $6,000." The carpenter builds a large box, sets in some partitions and the farmer moves in, calls one room the kitchen, one the dining room, one the parlor, and two the bedrooms.

Why have so few architects designed farm homes which fit the American way of life, the American countryside, and the type of farm for which they serve? Why are most American farm houses poor imitations of city mansions, or a box with partitions? And what would the ideal American farm house, say for a Midwest general farm, really look like; what would be its plan and how would it be furnished to contribute to 100 per cent utility, and still have beauty of setting and design? The editors of Farm Quarterly believe these questions can be answered just as they believe that American farms deserve an architecture which is truly American, something which springs from the American soil and the American way of life on a farm.

For two years the editors have been studying this problem and are collaborating with the University of Cincinnati Department of Architecture, and with farmers and farmers' wives in developing such a farm house. The Department and the editors of The Farm Quarterly are now consulting with farm wives and farmers, and farm engineers, and from the information

CLAY

ELECTRIC BARN CLEANER

GUARANTEED SATISFACTION OR YOUR MONEY BACK

If purchaser is dissatisfied, cleaner may be returned any time *within 90 days of original shipment date* for complete refund.

ONE MOTOR ONLY . . . One motor . . . Less working parts. This means long-lived, trouble-free operation. *Most cleaners require 2, 3, sometimes 4 motors and 2 different kinds of chains.*

LESS COST PER COW . . . A choice of three sizes. You pay only for size, parts, and operation that exactly fit your needs. *No expensive pit inside or outside.*

NO STINKING PIT INSIDE . . . NO OUTSIDE PIT TO FREEZE IN WINTER . . . Means more cleanliness—fresher, healthier air—less odor—fewer parts. *Without pit, all parts easily accessible.*

PADDLES 12 IN. APART . . . Close spacing moves manure with minimum disturbance—minimum odor. No jamming of manure under cover plates. Close-spaced paddles pick up more liquids with solids. No churning, falling back of manure at elevator. Chain rides 2" above gutter bottom—out of corrosive liquid.

FITS ANY TYPE BARN . . . Choice of 8 chute positions means easy adaptation to old or new barns—less concrete work—more economical installation.

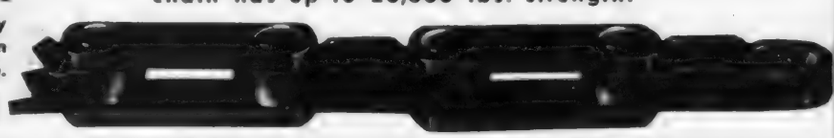
CLAY CHAIN STRONGEST

Not once has the Clay Barn Cleaner Chain broken in actual use.

Jos. B. Clay

ALLOY STEEL CHAIN—HEAT TREATED

The super-strength, rust-resistant, heat-treated chain has up to 20,000 lbs. strength.



You'll farm better—live better—when you switch from outmoded shoveling drudgery to power gutter cleaning . . . THE CLAY WAY. Increase your dairy profits—hold your boys at home—keep your help happier. Make your barn more sanitary—less odor. *Milk inspectors APPROVE Clay cleaners.*

LOOK AHEAD—FREE YOURSELF FROM THE NASTIEST, MESSIEST JOB ON THE DAIRY FARM. ACT NOW.

SEND FOR FREE BARN CLEANER CATALOG

MAIL COUPON TODAY

CLAY EQUIPMENT CORP., 911 FULTON STREET, CEDAR FALLS, IOWA

RUSH FREE Electric Barn Cleaner literature plus catalogs checked.

- ☐ Farm Windows
- ☐ Barn Ventilation
- ☐ Litter Carriers
- ☐ Milking Parlor Stalls
- ☐ Stalls and Stanchions
- ☐ Steel Gates
- ☐ Hog House Pens

CLAY

I have.....cows. I am building..... I am remodeling.....

NAME.....

TOWN.....

STATE.....RFD.....

The Kuder Citrus Feed Co. plant at Bartow, Fla., one of the largest citrus processing plants in the South East.

RECOGNIZED AS TOPS IN CITRUS PULP QUALITY BY DAIRYMEN THROUGHOUT THE EAST

KUDER CITRUS PULP

KUDER CITRUS MEAL
(Whole Ground Pulp)

BESTEST NATURE SWEET CITRUS PULP

Ask for these proven carbohydrate feeds 76% Digestibility—High in fat and sugars

For winter feeding and throughout the year use it and decide for yourself what thousands of dairymen have discovered—that Kuder and Bestest Nature Sweet Citrus Pulp bring results in the production of milk at low cost per unit of T.D.N.

For further information wire or write

KUDER PULP SALES CO.
LAKE ALFRED, FLA.

Sold through dealers from Vermont to Florida

gained are designing a farm home which we believe will mark a step in the right direction in farm house design in this country.

American architects have created some distinctive American designs—the skyscraper, the suspension bridge, and the Colonial church, but they have almost totally neglected the buildings for American farms. There have been two or three encouraging starts made on a distinctive American design for rural homes, but these, the Cape Cod house, the Pennsylvania Dutch house, and the ranch house of the Southwest, are either not farm houses at all, or are so regional that their adaptation results in houses similar to the monstrosity pictured above. The covered bridge and the pioneer log cabin are distinctly American; they are things of beauty because they are perfectly utilitarian and simple. Let's have the same beauty of design, the same perfect usefulness, plus comfort and convenience injected into a new American farm house. THE FARM QUARTERLY will publish the first of a series of articles on this subject in the Winter issue.

COWS AND ORANGES

(Continued from page 43)

drought conditions we have had a very short barley crop in California, with perhaps only 50% as much beet pulp available as last year.

"The orange pulp people have made a lot of progress in the last few years in standardizing their product. Before they learned to control their de-hydrator temperature, there was a lot of burned pulp on the market. This difficulty has been overcome and as a result, orange pulp is being generally accepted now as a first class dairy feed.

"Most California dairymen prefer about 10 or 15% orange pulp in their dry concentrate ration, but I have heard of beef cattle feeders using as high as 40 to 50%. From a feed standpoint, we think it is almost as good as good rolled barley and when properly made, it is very palatable. It has a very nice aroma and does not give any objectionable flavor to the milk.

"Last year there was a tremendous production of orange pulp and consequently in order to move their stocks, the dehydrators sold it at a very attractive price. This started so many feeders and dairymen using it that it is doubtful if there will be enough to go around this year."

One reason for the growing demand for citrus pulp feeds is that it ranks as a low cost feed on a total digestible nutrient basis, and farmers generally figure feed costs on the basis of T.D.N. per 100 pounds of feed. When the University of Massachusetts recently issued its "Suggestions on Best Feed Buys" in January, 1951, only apple pomace and potatoes outranked citrus pulp as low costs sources of feed, on a basis of T.D.N. per hundred weight, regardless of the fact that citrus pulp had to be shipped from Florida. Apple pomace was listed at $2.78, and citrus pulp at $3.85. Then followed brewers grain at $4.00, good mixed hay $4.40, dried beet pulp $4.78, alfalfa $5.20, and commercial grain concentrates at $5.93.

Later in the year the Dairymen's League listed feed prices in much the same manner and for March their list showed citrus pulp feeds topped the list for low cost in New York state. And from Maine to Florida the story has been similar.

There has been a smattering of research on citrus pulp as feed underway since back in 1911 when F. Alex McDermott, working on a fellowship from the Florida Citrus Exchange and the Mellon Institute saw cows eating the pulp and predicted that the citrus wastes might have a future as feed. No one paid much attention to McDermott, however, while the mountains of pulp continued to grow and the processors continued to cuss it.

Then in 1925 one Seth Walker set out to learn if these wastes could be handled in some better way. Patiently, he dried some grapefruit seed, peel and rag in trays over steam pipes. Eventually he collected enough to feed half a dozen Jerseys at the Florida Experiment Station some of the new dried feed in addi-

Architect: Burgess, Stevens & Purdy, Chicago

A Brighter Outlook on Your Farm

Your view of open country is the envy of those who live in cities.

Why not make the most of your opportunity? Open your walls with windows—windows generous enough to give you sweeping views of the outdoors. To make them even more enjoyable the year 'round, put *Thermopane** insulating glass in them. *Thermopane* keeps rooms warmer in winter—you don't have to move back from windows to avoid drafts. It cuts down frost and fog on windows. And in summer, *Thermopane's* insulation helps keep your rooms cooler.

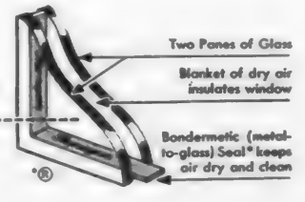
Thermopane makes windows self-insulating because dry air is hermetically sealed between its two panes of glass. You leave it in all year—no storm sash to bother with. It's the easiest way to insulate windows!

Whether you build or remodel, you can use *Thermopane* in the following types of window—double-hung, casement, awning, sliding or picture window. Your L·O·F Glass distributor or dealer, or your building supply dealer, can tell you more about *Thermopane* and sash for it.

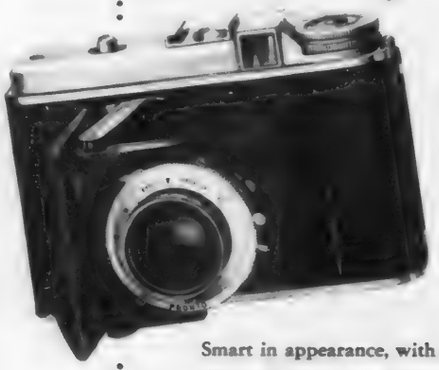
Write for our free *Thermopane* book and our folder, "Improved Farm Building Daylighting". Libbey·Owens·Ford Glass Company, 2191 Nicholas Building, Toledo 3, Ohio.

L·O·F GLASS *Thermopane* LOOK FOR THE NAME ON THE SEAL BETWEEN THE PANES

FOR BETTER VISION SPECIFY THERMOPANE MADE WITH POLISHED PLATE GLASS



Announcing the new



Voigtländer

PERKEO I

$49.50

CARRYING CASE $8.50

Smart in appearance, with streamlined chrome-finished body, the new Perkeo I is equipped with Vaskar f4.5 lens in Pronto Shutter and takes twelve 2¼ x 2¼ COLOR or black and white pictures on 120 film. It has many features including

- A LOCKING DEVICE TO PREVENT DOUBLE EXPOSURE
- FLASH CONTACT AND SELF-TIMING DEVICE
- BODY RELEASE • COATED LENS • DEPTH-OF-FIELD GUIDE

Mail orders filled. Liberal trade-in allowance on your used camera.

Willoughbys

WORLD'S LARGEST CAMERA STORE

110 West 32nd Street • 113 West 31st Street
New York 1, N. Y. • LOngacre 4-1600

OVER 45,000 FARMERS

HAVE SENT FOR THIS VALUABLE ALCOA BOOK ON

PORTABLE SPRINKLER IRRIGATION

Man-made rain, applied at the right time with sprinklers, is making farming more profitable all over the country. Worth looking into? This *free* 32-page Alcoa book will answer many of your questions . . . about equipment, costs, system layout and operation, water sources. Tells how easy-to-move aluminum sprinkler systems save labor, conserve water, increase yields, improve crop quality.

Get your FREE COPY... Mail coupon today!

ALCOA® ALUMINUM IRRIGATION PIPE

ALUMINUM COMPANY OF AMERICA
2154J Gulf Building, Pittsburgh 19, Penna.
Please send me "Portable Sprinkler Pipelines to Profit."

Name _____

Address _____

City or Town _____ State _____

Supply of Alcoa irrigation pipe may be limited by military needs for aluminum.

tion to their regular ration which was low on grain. Their milk production started to climb.

Here was proof, in a way, that citrus pulp was good feed, but still nothing was done about producing it commercially until a southern shipper contracted for a pile of grapefruit peel to be shipped to England for the manufacture of pectin. The shipping costs proved too high and the deal fell flatter than dust on a chuch floor. The shipper happily unloaded the peel with a southern Guernsey owner, whose cows munched it and immediately started giving more milk. This led an acquaintance of the dairyman to build the first commercial drier in 1932.

The citrus pulp feed which the new plant began turning out contained then, as citrus pulp feeds do today, about six per cent protein, three per cent fat, 14 per cent fiber, 55 to 60 per cent nitrogen-free extract, and a smattering of minerals. It is 76 per cent total digestible nutrients.

Citrus pulp feeds are neither high protein supplements nor roughages. They're some place in between, a palatable, bulky, carbohydrate concentrate rich in sugars, high in T.D.N., and low in protein. They should not be considered a roughage since they contain only 13 to 15 per cent fiber, about half the fiber content of hay. Because it is bulky, farmers feeding their first citrus pulp occasionally consider it a roughage until they learn that their cattle lose condition from too little fiber.

Bill DeVaughn, who milks a herd of 80 Jerseys and Guernseys near Vero Beach, Florida, feeds his milking animals three gallons of wet pulp a day. This is the processed pulp that comes from the drying plant which he soaks in water before feeding. He keeps his cattle on year 'round pasture and feeds them a pound of 20 per cent concentrate for every three pounds of milk. "I feed citrus pulp," he says, "simply because I've found that my cows give more milk and keep in better condition than just a concentrate."

The commercial citrus pulp driers which prepare feed from the citrus wastes are usually operated as part of a juice or concentrate plant. A few driers are completely independent and buy their wet pulp from juice plants.

There is a typical independent drier on the northern edge of Ft. Pierce, Fla. Here, in a small squat, metal-sided building topped with two tall chimneys, 21,000 tons of wet pulp are converted to 2,500 tons of dried pulp feeds every year. When the wind is right the citizens of Ft. Pierce catch the pleasant odor of orange peels drifting in from the processing plant.

In front of the building is a huge concrete pit into which dump trucks empty huge piles of gold colored raw pulp. A conveyor system moves out of the pit floor and across the top of the pit carrying a steady stream of wet pulp up to the hammer mill which pulverizes it. As the pulp moves on to the mixing vats lime is added

The *Greatest* RANCH & FARM GATE ever built

for **real** driving pleasure . . .
for **better** livestock protection . . .

Install A PUSH-OVER Automatic Gate . . .

You drive right over it—without stopping!

Sure stops gate cussin'

- *NO ELECTRICITY*
- *NO WIRES OR ROPES*
- *IT'S SELF-OPERATING!*

No need to stop to open and close your road-gate—just shift to low and keep your car rolling! When your bumper touches your PUSH-OVER Automatic Gate, it pushes over and down flat to the road . . . *stays down while you drive right over it* . . . then it rises back up to vertical position.

Entirely *automatic* hydraulic operation—safe, sure, effortless—your PUSH-OVER Gate saves time, energy, tempers!

Livestock cannot operate your PUSH-OVER Gate . . . yet *you* can easily push it down and brace it open to permit their passage. Eliminates cattle-guards and adjacent gates. *Saves you money!*

Sturdy *lifetime* construction (heavy steel pipe, welded) . . . proved fool-proof at Texas State Fair when cars, trucks and tractors drove over a PUSH-OVER 23,972 times! Guaranteed against defective materials, construction and operating failure for one year.

Made in 3 widths: 8-ft., 10-ft. and 12-ft.; all sizes are 4-ft. high. The PUSH-OVER comes to you completely assembled, attractively finished with aluminum coating—ready for easy installation. If you have a road-gate on your farm, ranch or estate, you need a PUSH-OVER Automatic Gate to make driving a joy!

YOU Can Afford a PUSH-OVER Automatic Gate

PUSH-OVER is not a "cheap" gate, but it is reasonably priced.

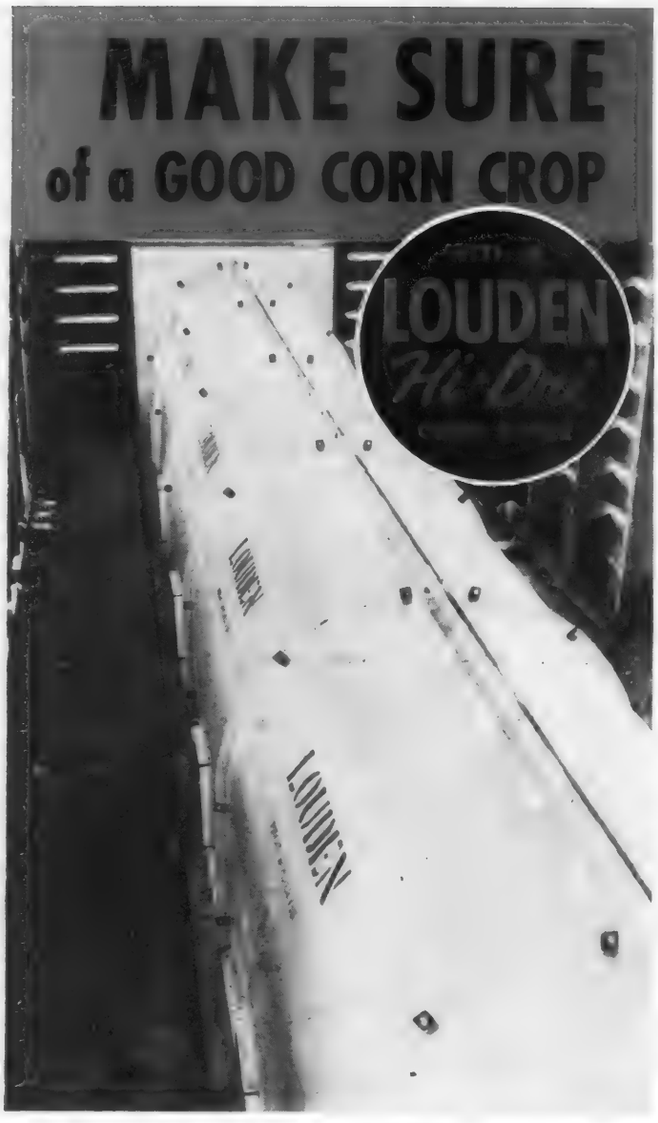
PUSH-OVER AUTOMATIC GATE
Reg. U. S. Pat. Off.
U. S. Patents Pending

Made and Guaranteed By

HAWLEY MANUFACTURING COMPANY

1152 Lockwood Drive, Houston, Texas

Write us today for complete details, illustrations, prices



STOP WORRYING about wet seasons, late corn, early frosts. With a Louden Hi-Dri Crop Dryer in the crib, your corn is sure to cure well. No heat needed, so drying-cost is low, but feed-value and cash-value are increased tremendously.

AVOID FROST DAMAGE — When corn matures late, your Hi-Dri is wise insurance against frost damage. You pick whenever YOU are ready, instead of waiting until corn is ready.

LOWER FIELD LOSS — Mechanical picking has increased the need for the LOUDEN Hi-Dri. With Hi-Dri in the crib, you can pick early before stalks become brittle. Result: less ear-droppage, shelling, or stalk-breakage.

ALL-STEEL construction assures longer life, freedom from warping and rotting, lower installation and operating cost. LOUDEN design assures uniform air-distribution, and best drying results. And the same fan-unit will mow-dry your hay or other crops.
See how little Hi-Dri costs, compared with the added value and protection it brings you. Send coupon now for full cost information.

GET MONEY-SAVING BARN BOOK — For economical labor-saving ways to modernize your barn, get the new Louden BETTER BARNS BOOK. This valuable 100-page book is yours for the asking — but a dime to cover mail cost will be appreciated. Send coupon NOW.

STALLS AND STANCHIONS

LITTER CARS

WATER BOWLS

ELECTRIC VENTILATION

MILKING PARLORS

Check and MAIL COUPON NOW
The LOUDEN Machinery Co.
329 E. Court St., Fairfield, Iowa

☐ Please send full information on drying corn with a Louden Hi-Dri.
☐ Please send your Better Barns Book.

Name.....
Address.....
.....

and once in the vats huge blades turn slowly through and thoroughly mix lime and pulp for about a half hour. The lime helps liberate the water bound in the peel and the screw-like presses can more easily remove it. The result is a yellow-white press cake ready to go to the drying ovens. A huge rotary drum dries the presscake down to eight to ten per cent moisture. From here the dried citrus pulp is blown onto an automatic scale which dumps 100 pounds into one burlap sack after the other all through the working day. The juices pressed from the raw pulp are condensed to make citrus molasses, a high carbohydrate content supplement for dairy cattle.

The operators of such plants realize that the feed they turn out varies somewhat from one day to the next and there isn't much they can do about it. Grapefruit varies from orange and tangerine pulp, and even seedless grapefruit varies from varieties with seeds. Those with seed yield a feed with higher fat content. And all pulp varies slightly with the season. Most pulp feeds are now a mixture of grapefruit and oranges which makes for greater uniformity. The guaranteed analysis is printed on the tag on the bag, and Florida State inspectors may drop in at the plant at any time to inspect the feeds. Consequently the manufacturer is careful to make his feed meet the minimum guaranteed specifications.

One of the early questions that comes to the mind of the citrus feeding farmer is how much of the stuff he should offer his cows. Scientists in Florida have been looking into this problem for some time. They found that they could reduce the roughage intake of their cows by a third if they fed citrus pulp as 40 per cent of their total digestible nutrient intake. The basic ration other than citrus pulp feed then became number one alfalfa hay, corn, corn silage, and supplemental concentrates containing corn meal and cottonseed meal containing 41 per cent crude protein. Dairymen in other sections of the country can use these percentages as a jumping off place and substitute proportional parts of their locally produced feeds.

In working out a feeding mixture for one Ohio experimental dairy farm, Dr. F. B. Morrison of *Feeds and Feeding* fame pointed out that dried citrus pulp, at an estimated price of $51.10 a ton (prices are higher today), supplied total digestible nutrients at the lowest cost of all the feeds considered. To allow the animals a 16 per cent mixture he suggested the following recipe for a ton of dairy feed:

	lbs. per ton	% protein	lbs. protein per ton
Barley	460	12.7	58.4
Oats	300	12.0	36.0
Corn Cob Meal	300	8.6	25.8
Dried Citrus Pulp	500	5.9	29.8
Soybean Oil Meal	400	44.3	177.2
Salt	20		
Bone Meal	20		
	2,000 lbs.		327.2

The dairyman can vary these proportions to take advantage of the seasonal costs of various feeds in his locality. And by changing the proportion of soybean oil meal he can alter the protein content of the supplement. The Ohio farmer who fed it, said, "If you have brown hay and low grade silage, even Dr. Morrison can't bail you out. Citrus is good stuff but dairy cattle live on good silage and hay."

The research people found that calves fed on citrus pulp did not scour. Some full grown animals have been fed over 16 pounds of citrus pulp a day and suffered no harmful effects. The secret in successful feeding of citrus pulp is to *balance the diet with ample protein and sufficient roughage.*

If you grab a handful of citrus pulp from the feed bag and taste it you leave the barn with a bitter after-taste in your mouth. If this is true in cows, too, they never seem to mind. But like a child eating olives, cows often have to acquire a taste for citrus. Some cows take to it without delay. Others are more finicky in their eating habits and require a breaking-in period before they settle down to a steady diet of dried oranges and grapefruit.

FOR POWER

Make it a Massey-Harris

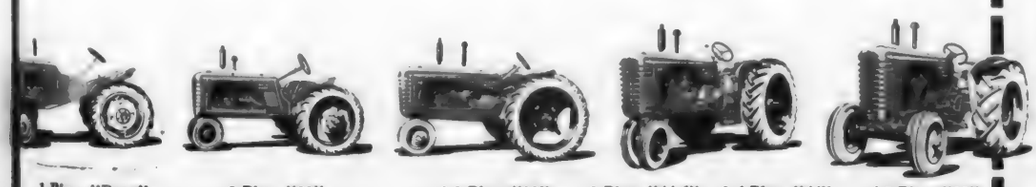
WHILE you'll never need a tractor to pull an elephant, you do need the POWER of a Massey-Harris on your farm.

The extra horsepower in every Massey-Harris Tractor makes short shift of heavy-duty drawbar and belt jobs. Plowing and discing move along more easily . . . planting and cultivating, more swiftly . . . harvesting, more successfully. Tough spots no longer slow you down. You can cover more acres each day — get more work done.

And done more economically, too. Massey-Harris Tractors not only give you more actual horsepower at drawbar and belt, but also more power from every gallon of fuel. Operating costs are lower. Impartial tests and the performance records of thousands of owners prove this. Additional economy in terms of longer life and lower maintenance and repair costs results from Massey-Harris heavy-duty construction, precision manufacturing and quality control.

Work is easier with Massey-Harris Tractors for another reason. You work in greater comfort. Shock-proof steering saves arms and shoulders. The Velvet-Ride Seat cushions the shocks and jars of bumpy fields. The Depth-O-Matic two-way hydraulic system powers tools into the ground as well as out.

Among the six basic power sizes and 28 models, there's a Massey-Harris Tractor to fit your needs exactly. See your Massey-Harris dealer the next time you're in town. Let him give you all the facts about Massey-Harris Tractors and demonstrate one on your own farm entirely without obligation. You'll understand why an ever increasing number of farmers say "Make it a Massey-Harris." For free folder by mail, use the coupon below.



1-Plow "Pony" 2-Plow "22" 2-3-Plow "30" 3-Plow "44-6" 3-4-Plow "44" 4-5-Plow "55"

THE MASSEY-HARRIS COMPANY
Quality Avenue, Racine, Wis., Dept. J-222

Please send me a copy of your latest catalog of Massey-Harris Tractors.

Name .....
(Please Print)

Town ..... R.F.D. .....

County ..... State .....

MAIL THIS COUPON

VOGEL
PATENTED

FROST-PROOF HYDRANT

- Will never freeze when properly installed.
- Running water available all year 'round.
- Reduces fire hazard.
- Increases operating efficiency.
- Over a million Vogel Frost-Proof Closets and Hydrants have been sold.

The handle in this position shows at a glance that the water is positively shut off and is your guarantee against freezing and leakage.

★

VOGEL No. 4 FROST-PROOF CLOSET

Will never freeze when properly installed. A great convenience when installed in an out building or on a rear porch of a residence.

Vitreous China bowl is very durable and easy to keep clean. It is so constructed that it will never freeze. No Mechanism in tank to get out of order.

Joseph A. Vogel Co.
Wilmington 99, Del.

JOSEPH A. VOGEL CO.
Wilmington 99, Del.

Please send information about Vogel frost-proof closets and Vogel frost-proof hydrants.

NAME .....

ADDRESS .....

TOWN ..... STATE .....

ROTO-CUTTER mows every blade in tall grass, weeds, plantain, etc.—cuts forward, backward, sidewise in arc. Easy to work close up to trees, shrubs. Versatile; cutter easily replaced with Roto-Hoe; motor used as portable power unit. Roto-Cutter complete with 2 h.p. Lauson motor, $122. (Add Roto-Hoe unit any time—only $52 more.) Ask your dealer for demonstration; or write for facts. (Dealer inquiries invited.)

ROTO-HOE & SPRAYER CO.
BOX 7 NOVELTY, OHIO

One Midwest farmer who ordered a ton of citrus pulp from Florida wished the first day he tried to feed it that the fruit had rotted on the tree. The cattle wouldn't eat it.

At first he had sprinkled some of the dried pulp on top of the protein supplement. The cows dipped their muzzles into the feed box, their faces took on a puzzled look, and they straightway ignored the whole serving. The farmer figured that a few feedings at this rate and he'd have his whole herd off their milk, so he switched back to his old feed.

But then he started thinking about the way he was introducing his cattle to the new feed and he came up with an answer that worked. He thoroughly mixed a few pounds of the citrus with the grain feed and to his relief the cows settled down to eating as though they'd had orange juice and grapefruit for breakfast since birth.

With each passing day the farmer increased the proportion of citrus in the ration and soon had the cows looking forward to the new feed as much as the old. In keeping with the suggestions of the animal husbandrymen he stopped increasing the citrus feed when he was feeding between four and five pounds per feeding. With the cows adjusted to the idea his feed bill went down somewhat and his cows did as well as ever.

Dairymen have found that a pound of dried citrus pulp daily for every 100 pounds of live weight in the animal gives good all around results in animal health and milk production. Used in combination with silage a pound of citrus pulp replaces five pounds of silage.

And what happens to citrus pulp in the rumen of a cow? The Florida research men have looked inside the cow and found that of the grapefruit pulp's 76 per cent T.D.N., steers digest about 25 per cent of the protein, 72 per cent of the fiber, 92 per cent of the nitrogen-free extract and 80 per cent of the fat in the citrus pulp. Still other feed trails proved that steers on a ration of hay, cottonseed meal, minerals, and dried citrus pulp fattened more economically than those fed on a ration where corn replaced the citrus pulp.

Steers on feed tests gained 2.17 pounds a day for 120 days on a diet including citrus pulp. With this feed the steers required 466 pounds T.D.N. for every 100 pounds gained. When corn was substituted for the citrus pulp, they required 484 pounds T.D.N. for 100 pounds of gain, and gained 2.53 pounds a day.

These research men concluded that steers on dry lot be fed five to seven pounds of good hay, three pounds of cottonseed oil or its equivalent, and eight or nine pounds of dried citrus pulp daily.

A feeding trial with 38 Holstein cows in Massachusetts replaced beet pulp with citrus and everybody concerned, including the cows apparently, was happy. Stanley Gaunt, Extension Dairyman at the University of Massachusetts says, "We think citrus pulp is a good feed for dairy cows. It is at least equal to beet pulp in feeding value, and perhaps a little more than equal. Cows relish the citrus pulp, and it's a rare occasion to find a farmer claiming that his cows won't eat it."

The research director of one of the country's biggest feed manufacturers says, "The chief objection we have to citrus pulp is that whenever we buy it in large lots and employ it as part of our feed, we get complaints from customers that the citrus pulp varies in quality. This is due apparently to two factors; first, the processors don't use the same proportion of citrus fruits every day. Second, the processors' method of dehydrating the pulp does not guarantee a uniform product.

"Dairy men and beef feeders are fussy about the feed they buy. In some of our mills we are using a meager amount of citrus pulp so that if it does vary, it won't change the composition of the feed much. We expect citrus pulp to grow in popularity and we want to keep our fingers in it and observe results as it improves. I think every feeder would want to be familiar with it.

"We have had no complaints about citrus pulp giving flavor to the milk. The most citrus pulp which can be used is up to one-third of the grain mix.

"While we do know the TDN of citrus pulp, there are other factors in it, both good and bad, no doubt, that we have yet to learn by actually feeding it and observing the results."

Round Up of Recommendations

Bringing all the findings of the various feed tests and the word of practical farmers together produces the following list of suggestions for feeding citrus pulp:

1. As a rule of thumb, a pound of dried citrus pulp is equal to five pounds of silage.
2. Fed with good roughages, citrus should be fed at the rate of one pound a day for every 100 pounds of live weight.
3. Up to 40 per cent by weight of concentrate mixtures can be citrus pulp to replace more expensive feeds.
4. Citrus pulp makes a good supplemental feed with home grown grain and silage.
5. It should be fed dry.
6. Be sure cattle also get plenty of good hay or pasture.
7. When fattening stock also feed cottonseed or other high protein supplement and a mineral supplement.
8. Feed citrus pulp to dairy cows only during or shortly before milking.
9. Be sure cattle are getting enough vitamin "A" either in good quality alfalfa hay or in a supplement.

The Bad Points

The drawbacks of citrus feeds are few but a farmer should know them in advance.

Production is seasonal because the citrus

In every kind of weather...

ALUMINUM STAYS ON THE JOB!

Lashed to the flight deck, soaked with salt spray, the Navy's fighting planes ride out storms at sea. Then at a moment's notice they must streak into the sky. Twist in aerial combat that strains every fiber of plane and pilot.

The aluminum skin on these sturdy planes is protected by the same cladding of pure aluminum as Alcoa Aluminum Roofing Sheet. Aluminum serves best for both planes and roofs because it is strong, economical and stands up to wind and weather.

Start your planning now for a long-lasting, heat-reflecting roof of Alcoa Aluminum. We will send you a free folder giving all the facts. How easy it is to put on. How proper application adds to strength and life. How thrifty aluminum saves you money, never needs painting.

Because rearmament needs come first, your dealer may not have a full stock of Alcoa Roofing. Place your order well in advance. We are working at full speed to increase our aluminum production. When the Armed Forces have all they need, your dealer will have more Alcoa Roofing for you. Get all the facts on this better, longer-lasting roofing now . . .

84 SQUARES OF ALCOA ROOFING PUT ON IN TWO DAYS

Thirty-eight days after Oris Hostetler's barn, near Wooster, Ohio, had burned down, this new one was completed. The roof of large, easy-to-handle Alcoa Aluminum Sheet was put up in two days by four men. Says Mr. Hostetler, "Now I have a fire-resistant roof that will shed sparks as well as wind and snow. Last month, high winds did extensive damage in this county, but didn't affect my aluminum roof. I notice my barn is cooler, too, on hot days. That gleaming aluminum keeps hot sun rays out."

The aluminum for this barn was supplied by A. S. Wengerd, Millersburg, Ohio.

ALCOA ALUMINUM

ROOFING SHEET

MAIL THIS COUPON TODAY

ALUMINUM COMPANY OF AMERICA
2114J GULF BUILDING, PITTSBURGH 19, PA.

Please send me a free folder on Alcoa Aluminum Roofing and instructions for proper and easy application.

Name_____

Address_____

City (P. O.)_____ State_____

My building supply dealer is:_____

crop is seasonal. This means the processors must work fast during the harvesting season to carry over enough feed for the rest of the year. The citrus industry is, of course, trying to maintain a year 'round supply, but last winter they nearly ran out of the dried feed attempting to meet a growing demand.

A farmer occasionally reports that his citrus-fed cows give milk that tastes strong, like a chewed orange peel. These reports, however, are rare, and the majority of farmers using the feed have never had this trouble.

No one can deny that citrus pulp is low in phosphorus and vitamin "A," but knowing these facts the stockman can compensate by supplying them in other forms.

Citrus is bulky, and this has led some farmers to consider it a replacement for roughages, which it is not. It should always be fed with good hay or pasture.

But these are not serious shortcomings. Dried citrus pulp is generally cheaper than any other feed he can buy on the basis of the cost of T.D.N. per hundred weight. This is true in both north and south. The farmer who buys dry citrus pulp does not pay for water.

THE AUTHOR: Harold R. Brundage is attending a Florida citrus school being operated by the USDA. Born near Pleasantville, N. Y., in 1911, Brundage obtained his B.S. in agriculture from Cornell in 1933. There followed several years of teaching and extension work. He moved to Florida in 1948 and operated a motel for a couple of years before joining the forces of the Florida PCA. He thinks Florida is wonderful, but says that farmers planning to go there to farm should know more about the state than most of them do before they start.

CONSERVATION DISTRICT

(Continued from page 47)

Not all Fulton County farmers have seen the light. There will always be skeptics like the Fulton County farmer who said in a letter to the weekly Fulton Democrat, that contouring is a waste of time, and the way to less erosion in Fulton County is "raise more cattle and hogs."

The operation of the Fulton County Soil Conservation District is much like that of other districts across the country. The farmers, through their board of directors, run the organization.

A conservation district can own property. The Fulton County District has a bulldozer, a terracer, and a small truck. The farmers rent this equipment and the rental goes into the organization's treasury. When there is enough ahead the district will likely buy another piece of equipment. In many conservation districts the farmers hire custom workers to help them build terraces, diversion ditches, and farm ponds.

The county district organization usually lines up other agencies as cooperators. Fulton County cooperators include the Pennsylvania Departments of Forestry, Game, Fish and Highways. The Soil Conservation Service supplies farmers with seedling trees and shrubs, including multiflora rose in fencing. The U. S. Fish and Wildlife service supplies fish for ponds.

Merrill Nace, cashier in one of McConnelburg's two banks, says, "There isn't any question about the fact that our farmers are better off today because of conservation. I remember that over in the Cove, in years past, big families sat around the fire and picked walnut kernels out all winter to make extra money. They don't have to do that any more."

Some Jobs The SCS Helps The Farmer Accomplish

***Contouring, Contour furrowing, Contour sub-soiling, *Terracing, *Diversion Channels, *Strip Cropping, *Stubble mulching, Crop Rotation Cover Crops, *Fertilizing land, *Drainage, *Irrigation, *Water Spreading, *Protection of channel outlets, Pasture Development, *Pasture Improvement, *Green Manuring, *Perennial Hay Production, *Gully Control, Field and Gully Planting, Woodland Harvesting, *Improvement Cuttings, *Pond Management, Windbreaks, Management of odd shaped areas.**

***Practices for which PMA allows payments to farmers in Pennsylvania.**

As the profits and benefits of soil conservation practices become apparent the number of districts grows each year. The success of farmers like Traux and Palmer is convincing a growing number of farmers that they can live better from their land. The general improvement in the health of whole counties, like Fulton County, Pennsylvania, is stimulating farmers in unorganized counties to get together and set up their own soil conservation districts.

a soil remineralizer

ACTUAL PHOTO OF PLANT AND MINE, AT MEDFORD, N. J.

Glauconite Potash Mineral, also known as Greensand-Marl is a safe source of POTASH and the essential TRACE ELEMENTS. The soils of most farm lands and orchards are potash-hungry. Greensand-Marl rounds up and makes available to crop plants the essential elements which are already present in the soil, through **Base-Exchange.** Absorbs and holds WATER and stimulates beneficial soil organisms.

Greensand-Marl is proved by over 100 years' use, according to Government bulletins, but its value in The New Agriculture is just beginning to be appreciated.

APPLICATION—**Amount:** a ton to one-half ton per acre. Can be used effectively with **AA Quality** PHOSPHATE ROCK and **AA Quality** AGRINITE, the all-organic plant food with 8¼ per cent nitrogen.

Time: Now or at any time—Does not burn growing plants, will not leach away, will provide nutrients for many years; it is odorless, non-corrosive.

How: Spread on the land at ANY time of year; use on growing crops, pastures, orchards, nurseries, truck farms, lawns, gardens, golf courses. Acts like magic because potash and trace elements are plant-absorbable. Insures Green Pastures. Restores apple orchards to the production of quality fruits.

See your dealer or write to —

NATIONAL SOIL CONSERVATION, INC.

Dept. N. S.

90 West St., New York 6, New York

AT LAST!

A PERFECT TRIO

AA quality phosphate rock and **AA quality** Agrinite. They can be used effectively together or separately.

DAIRY BARN

(Continued from page 14)

amounts received for the extra work ranged from a few dollars to $2,000 per cooperative. All the cooperatives which showed savings at the end of the year, in any great amount, did enough outside work to account for 70 per cent or more of their savings, with the exception of those having only one field man.

6. The DHIA cooperative needs responsible supervision. Too often the directors do not assume responsibility for the cooperative's operations, and the organization drifts into the red. McNall suggests that the board get early help from the county agent rather than wait to call in the county agent after the situation becomes bad.

Savings Essential

7. Savings are essential to a healthy cooperative, and money should be set aside regularly for replacing equipment. There should also be a fund for meeting losses from bad debts. McNall suggests that for the first few years 10 per cent of the income be put in such a fund.

8. Good records are important, both for good daily business management and for reports to government agencies, such as the secretary of state and the internal revenue office.

9. Combining two cooperatives, when possible, may often be to the advantage of both, since savings can be made this way in rent, operating costs and money spent for wages. A combination of this type could be of different types or organizations, such as a dairy herd improvement and a breeder's organization. Again, two or more county improvement cooperatives could save money by using one central laboratory.

McNall says that the healthiest cooperative Dairy and Improvement Associations are those that have recognized these points and lived by them.

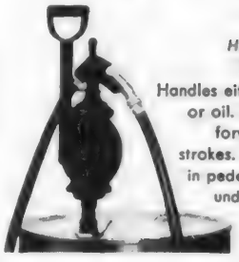
Double-Edged Paint The farm inventor who tried to develop a whitewash brush with a fly sprayer attached can relax, for Tykor Products, a Division of The Borden Company, has developed "Sano-White," a new white wall coating that can be sprayed or brushed on. It not only gives an attractive and sanitary coating, but it contains the two new long-lasting residual insecticides, *Chlordane* and *Toxaphene*. *Lindane* or *Methoxyclor* may also be mixed with "Sano-White." Borden developed this wall covering to meet the sanitary code requirements in their own dairy barns, and it will soon be marketed for dairy farmers all over the country. The cost is approximately the same as whitewash and it requires no special equipment to spray it on.

Now—Your Own Service Center

RIGHT ON YOUR FARM!

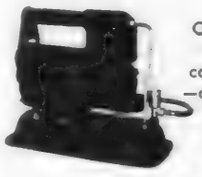
ELECTRIC POWER-PUMP

Compact. Ruggedly built. ¼ HP motor. Delivers approximately 10 gallons of motor fuel per minute. Easily installed.



HIGH-VACUUM HAND PUMP

Handles either motor fuel or oil. Pumps on both forward and back strokes. Also available in pedestal model for underground tank.



PORTABLE AIR COMPRESSOR

Operates on 110-V AC outlet. 90 lbs. continuous pressure—ample for inflating tires, greasing, dusting, spraying, painting.

SELF-MEASURING BARREL PUMP

Crank-operated. Discharges one quart at every stroke of plunger. Equipped with bottle-filler tip and return-drip tube.

DEPENDABLE, ONE-STOP FACILITIES FOR FUELING, LUBRICATING, INFLATING TIRES AND A SCORE OF OTHER MAINTENANCE JOBS

Now—one-stop farm-yard service for machinery and equipment is a reality. A single location where tractors, trucks and cars are refueled, tires are inflated, moving parts are lubricated, oil is changed and many other maintenance jobs are attended to. Rolling equipment is kept in tip-top shape. Its life is extended. Fire hazard to buildings is reduced. You save precious time and money; keep your farm orderly and running smoothly.

EASY TO OWN

Owning your own service center is really very simple. You provide an inexpensive shelter which you can buy or build yourself. Tokheim supplies the equipment: an electric gasoline pump designed for the farm, a hand pump for fuel or lubricants, an air compressor with grease gun, spray gun, dusting gun and air chuck. The hand pump may be substituted for the electric pump if desired and a lower priced barrel pump may be used for oils. Installation is simple. Cost is surprisingly low. Send coupon today, or write.

General Products Division

TOKHEIM OIL TANK AND PUMP COMPANY
1684 WABASH AVE., FORT WAYNE 1, INDIANA

QUALITY TOKHEIM FARM PUMPS

Tokheim Oil Tank and Pump Co., 1684 Wabash Ave., Fort Wayne 1, Indiana
Send information and literature on equipment for my own service center.

Name_____

Address_____

City_____ State_____

Oil Supplier_____

Look at the Label

. . . on the insecticide you buy for use on your dairy cattle and in your barns. *The ingredient statement is what counts.*

Insecticide manufacturers are required by law to show exactly what the active ingredients of their formulations are. *Be sure* the ingredient statement on the label of your dairy insecticide shows —

PYRETHRINS
and
piperonyl BUTOXIDE

This combination of insecticidal ingredients kills *all* the insects that commonly attack dairy cattle, *even horseflies.* Yet it *won't contaminate milk* with toxic materials. It was originated by U.S.Industrial Chemicals Co., Division of National Distillers Products Corporation, is *manufactured exclusively* by U.S.I., and is sold under the trade name —

Pyrenone*

to insecticide manufacturers who use it to make finished insecticides.

Even if the insecticide manufacturer doesn't say "contains Pyrenone" on his label (although many do), you can always tell a Pyrenone insecticide by looking for *"Pyrethrins* and piperonyl *butoxide"* in the ingredient statement.

U. S. Industrial Chemicals Co.

Division of National Distillers Products Corporation

60 East 42nd Street, New York 17, N. Y.

Branches in all principal cities

In Canada: Natural Products Corporation, 738 Marin Avenue, Montreal, Canada

**Reg. U.S. Pat. Off. Designates combinations of pyrethrins and piperonyl butoxide.*

HARD FACTS ABOUT GOING TO GRASS

(Continued from page 55)

preservative. The higher the percentage of grass, the less your need for wilting and the greater your need of a fine cut such as a half inch. The higher the percentage of legumes, the more need for wilting or, if you don't wilt legume hay, then add a preservative such as 60 to 80 lbs. of molasses per ton, or 200 pounds of corn cob meal per ton.

"Unwilted hay that is high in legumes keeps out the oxygen and holds off fermentation. When heavy legume hay is wilted up to two hours in a blazing sun it will save the cost of a preservative and reduce the run-off of silo juices. It also takes less power to move it up the silo.

"Tramp the silage every day for four days. Silage that has air in it gets hot and turns brown due to the oxygen in the air which allows the grass to burn. No air, no heat.

"With all this fussing around to make sure that the brome or orchard doesn't kill out the legumes, you might think it would be just as well to use straight legumes. especially alfalfa. There are several good reasons why you don't want to seed straight legumes.

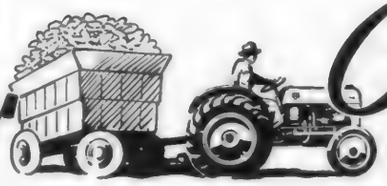
"Grasses and legumes should be mixed, with the grasses predominating, first to prevent bloat; second, because you will protect the land better by having a mixture than by having straight alfalfa since alfalfa grows in bunches. This bunching enables water to run around it and erode the soil, whereas if grasses are also seeded they fill in these spaces and leave no place for the water to cause erosion. The third reason is because you get a greater yield of feed from an acre by having a combination of grasses and legumes. Fourth, is the fact that some grasses grow better on some kinds of soil, and others on another kind. There are many kinds of soil, even in fairly small spots in an acre, and by having a good mixture of grasses you are sure of having a stand of grass. Furthermore, each grass has a best time of year to grow, and by having a combination of grasses you have some grass at its best all the time. It is well known that livestock like to graze mixed grasses better than a straight grass pasture. That might be because of the way the grasses grow, as suggested above. And last, the grasses keep down the weeds.

"The main tools you need are: a forage harvester, two tractors, a mower, a force feed fertilizer spreader, a drill and disc. In a corn, wheat, clover rotation, you don't count on your cattle spending three or four years in the same field. Under grassland farming, your cattle will be two to three months a year in each field. That means you need water in every field and, on most farms, nature didn't provide this. On rolling land, where grassland farming is so ideally suited because it preserves the soil fertility, a half-acre pond is easy to install for $800 complete, with all labor purchased. From this pond, water can be pumped to concrete watering tanks in the fields where you need them.

"Where does the money come from to buy the commercial fertilizer, forage harvester, the extra tractor, and. later the pond and the pump? A general farm of 100 acres on wheat, corn and clover will carry 30 head of cattle, using the national average *of the middle 3,000,000 farms.* A grassland farm of 100 acres, with the purchase of 2,000 bushels of grain and 5 tons of protein supplement, will feed one hundred head of cattle. Grassland farming is the difference between spending $4,000 a year on a 100-acre general farm and grossing $5,000; and spending $16,000 a year on a grassland farm and grossing $22,000.

"With 70 more head of cattle, there is less hand labor by 20%, because the forage harvester is so efficient and the cattle feed themselves between May and November. The new harvesters mow, chop and blow in one operation.

For Bigger Better Crops Next Year



Test Your Soil NOW

Fall is the Most Profitable Time To Test Your Soil

Now is the best time to find out what your soil needs to produce bumper crops in every field! You can see how much fertility this year's crops took out of the soil, and know in advance the right kinds and amounts of fertilizer to buy this winter and next spring. There's still time to correctly fertilize the crops you put in this fall (experiment station tests prove it is highly profitable to test and fertilize even meadows and pastures).

It's Easy To Do

You can make tests anywhere, anytime—even right out in the field, get your answers on the spot, with the Sudbury Soil Test Kit.

Get Back $3.00 or More from Every Fertilizer Dollar!

You'll get up to $3.00 or more in extra yield for every dollar's worth of fertilizer your tests show is needed. Trials on seven Illinois fields proved that for every $14.42 spent on potash and phosphate $43.00 came back in greater yield. Some farmers waste lime where it's not needed—others don't use half enough. An Illinois farmer saved $500 by not using 235 tons of limestone he "guessed" he needed but didn't; that paid for all the phosphate needed on 65 acres.

Soil tests may show you don't need high priced nitrogen fertilizer; not using enough phosphate may be locking up the nitrogen and potash so crops can't use them. Valuable manure may be going to waste unless you add to it the right fertilizer.

—Photo Courtesy Wisconsin Agricultural Experiment Station

As this picture shows, even after liming and using phosphate where soil tests showed they were needed, also adding potash raised corn yields greatly. Balanced fertilizer guided by soil tests can produce 100 bushels per acre, even up to 150!

Everything for Hundreds of Tests

SUPER DE LUXE MODEL—so simple anyone can use it! So reliable that county agents, Ag. colleges, extension workers and progressive farmers everywhere depend on it. Shows right amounts of nitrogen, phosphate and potash to put on each field for bumper crops. Tells whether lime is needed (pH) and how much for 225 crops.

Lifetime, welded steel chest with carrying handle. Full directions. Was $27.50 — increased demand has made it possible to reduce to **Only $24.95**

Dealers: Write for Special Offer!

No Knowledge of Chemistry Needed

Get Bigger and Better Crops For Only 3c An Acre

Just adding fertilizer without knowing which kinds and amounts your soil needs, wastes a lot of money and can do more harm than good.

The easiest way to test your soil is with a Sudbury Soil Test Kit. There's no waiting for reports. You get your answer when you make your test. Takes less than 10 minutes, costs less than 10c per test—the best investment you'll ever make.

Our Daring Guarantee

Whether farming is your business or hobby, you want to increase your yield. Enthusiastic users all over the U. S. tell of huge crop increases and big savings in fertilizer.

That's why we dare to guarantee to refund the FULL purchase price anytime within one year, if you don't get bigger and better crops with your Sudbury Soil Test Kit! You be the judge—we know you'll never part with it!

FREE TRIAL

Now is the best time to test your soil. Your Sudbury Soil Test Kit will come to you by return mail, if you send the coupon *today!*

SEND NO MONEY—Get your Sudbury Kit C.O.D., $24.95 plus postage, or send check and we pay postage. See how easy it is to use, at our risk—if not delighted, return kit within ten days for FULL refund.

Sudbury Soil Test Kits

Over 250,000 Now in Use

You Can Get Results Like These

H. C. B., Ohio, tested his soil and boosted his production on corn 300%, oats 500%. He also increased his production on wheat 100%, hay 300%.

A. D., Indiana, nearly doubled his corn yield after testing his soil. He also gets more wheat and soybeans from each three acres than he used to get from four acres.

Soil tests showed R. S. C., also of Indiana, potash was badly needed . . . increased his corn yield 20% . . . saved him money on fertilizer.

S. B. C., Texas, has saved almost $20,000 worth of fertilizer in one year alone by testing his 1300 acre orchard —and even increased his yield at the same time!

FREE TRIAL Send Today!

SUDBURY LABORATORY, Box 767, South Sudbury, Mass.

World's Largest Makers of Soil Testing Equipment

SUDBURY LABORATORY
Box 767, South Sudbury, Mass.

Send the Super De Luxe Sudbury Soil Test Kit at the special reduced price of $24.95 (formerly $27.50).

☐ Enclosed is $ Send prepaid. ☐ Send C.O.D. plus postage

Name .....

R. D. or Street .....

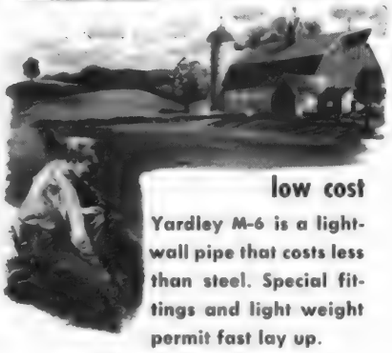
Post Office ..... State .....

Yardley
Plastic Pipe
AND FITTINGS
developed for farm use

Much lighter than metal pipe . . . ⅛th the weight of steel . . . but lasts far longer. Will not rot, rust or corrode.

Made in two standard wall thicknesses from a strong, semi-rigid, non-toxic plastic material for jet well settings, cold water lines, irrigation, drainage, sewage disposal systems and well casings.

Complete line of plastic fittings and adapters for every type of installation.



low cost

Yardley M-6 is a light-wall pipe that costs less than steel. Special fittings and light weight permit fast lay up.

standard iron pipe sizes

Yardley M-3-S is threaded and coupled. Can be cut and threaded faster than metal pipe. Full line of standard plastic fittings.

SEND FOR DESCRIPTIVE FOLDERS

YARDLEY PLASTICS CO.
128 PARSONS AVE., COLUMBUS 15, OHIO

"I like grassland farming not only because it keeps up soil fertility, and is much more profitable, but because it provides the money to buy tools that give me more leisure. I passed 70 last month, and I'm beginning to want time to catch up in my reading," says C. M. Long.

Self-feeding during winter is also now possible through the Martin Haymaker; a tall cylindrical steel tank in which 30% moist hay can be blown and then dried by forced air. The Haymaker self-feeds hay into bunkers at the bottom. Automatically unloading silos, which take the silage off the bottom of the stack, are another wonder tool that save a half hour a day from November through March. And either a hay crimper, a dehydrator or a barn flue forced air ventilating system decreases the chances of sun bleached, rain leached hay.

Because farm labor is unreliable, high priced and hard to get, the grassland money-making farmer has been among the first to take advantage of these machines that do away with hired hands. An indication of how far some farmers have come is this remarkable statistic from the United States Department of Agriculture: "Of the nation's 5,400,000 farms, 102,000 do 24% of the business; yet they employ only 8% of the labor."

Editor's Note: There are many places in the northern half of the corn belt where spring oats do poorly. Here it will be necessary to use a fall seeded nurse crop which requires a different practice. This will be sent free on request. Address C. M. Long, 521 State St., West Lafayette, Ind.

SHOULD I RAISE BROILERS?

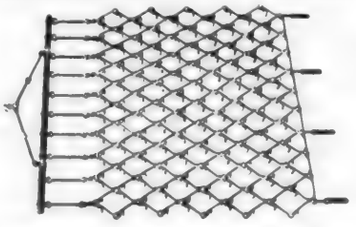
(Continued from page 35)

project he should think twice about the matter. On the other hand, if he has man-power going to waste, broiler raising might be the ideal way to put two or three hours a day to profitable use.

The Hall brothers have found that they can handle their 6,000 birds by working together for two hours a day. "The boys have done so well with this first unit," their father said, "that we planned to build another one just like it. I'm sure that they could handle them both easily and still have time to help me with the general farm work."

Broiler raising is not exactly light work, but compared to running a dairy farm it is about as strenuous as a romp in the hay. With feed carts and efficient equipment, a woman can manage it nicely, except for the clean-up weeks that come four times a year between batches. Because of the light work, many broiler projects are operated by the farm wife or widows who have been left with farms. Though the work requires careful attention, it is not confining. If a broilerman wants an afternoon off, he can take it. If he wants to

GRASSLAND FARMERS Acclaim SUCCESS of Imported English
HOMER FLEXIBLE TINE HARROW



This great multi-purpose tillage tool, made in England by Homer's, a manufacturer of harrows since 1887, now enjoys greater success than ever in America. Here's how it leads to increased income for you:

- Superior for conditioning pastures
- Ideal for finishing seed beds
- Becomes chain harrow when turned over
- Two harrows can be drawn side by side
- Hard steel links ⅜" with 3½" tines
- 10 feet wide. Weighs approximately 280 lbs.
- Furnished with drag weights and spreader

Write for additional information on other types of imported English harrows—and for the name of nearest dealer.

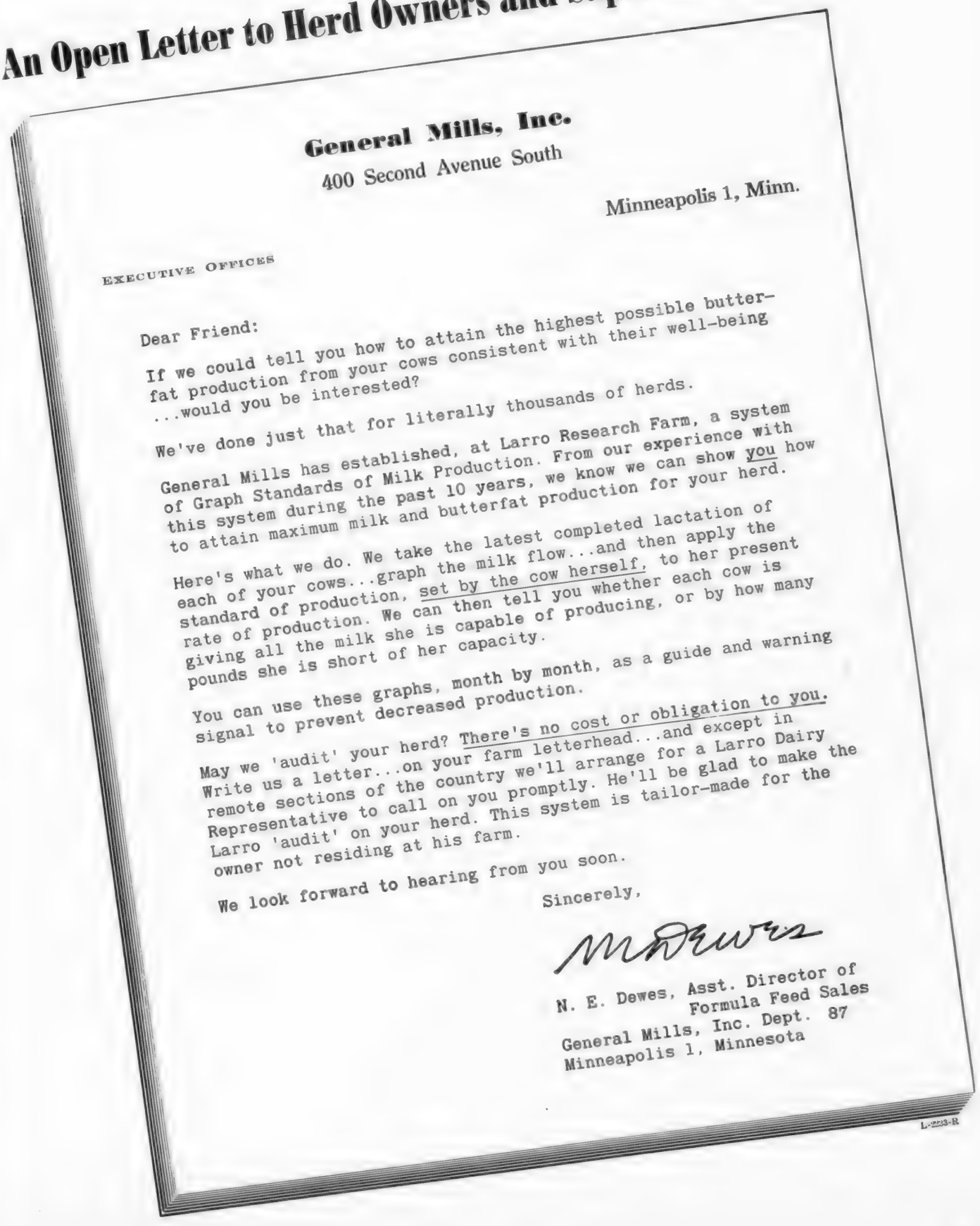
AMERICAN DISTRIBUTORS
FUERST BROTHERS AND COMPANY LIMITED
NEW YORK AGENCY
67 NASSAU STREET NEW YORK 38 N.Y.

SHORT OF HELP? . . . .
A Dump IT HOIST will do the work of
UNLOADING

100 Times FASTER than Shoveling. Truck, equipped with Dump IT Hoist, can DUMP its load in 20 seconds!
4 DUMP IT Models
COLT — MUSTANG
PONY — STALLION
There's one to fit your truck

— — — Clip Coupon — Mail at Once — — —
ST. PAUL HYDRAULIC HOIST
2224 Univ. Ave. S. E., Minneapolis 14, Minn.
Without obligation, send me complete information on DUMP IT Hoist to fit my truck:
MAKE _____ MODEL _____
WHEELBASE _____ BODY LENGTH _____
My Name _____
Town _____
R.F.D. _____ State _____
The RED HOIST that has made history

An Open Letter to Herd Owners and Superintendents



General Mills, Inc.

400 Second Avenue South

Minneapolis 1, Minn.

EXECUTIVE OFFICES

Dear Friend:

If we could tell you how to attain the highest possible butterfat production from your cows consistent with their well-being ...would you be interested?

We've done just that for literally thousands of herds.

General Mills has established, at Larro Research Farm, a system of Graph Standards of Milk Production. From our experience with this system during the past 10 years, we know we can show you how to attain maximum milk and butterfat production for your herd.

Here's what we do. We take the latest completed lactation of each of your cows...graph the milk flow...and then apply the standard of production, set by the cow herself, to her present rate of production. We can then tell you whether each cow is giving all the milk she is capable of producing, or by how many pounds she is short of her capacity.

You can use these graphs, month by month, as a guide and warning signal to prevent decreased production.

May we 'audit' your herd? There's no cost or obligation to you. Write us a letter...on your farm letterhead...and except in remote sections of the country we'll arrange for a Larro Dairy Representative to call on you promptly. He'll be glad to make the Larro 'audit' on your herd. This system is tailor-made for the owner not residing at his farm.

We look forward to hearing from you soon.

Sincerely,

N. E. Dewes, Asst. Director of Formula Feed Sales

General Mills, Inc. Dept. 87
Minneapolis 1, Minnesota

L-2213-R

FARMERS PRAISE THE LEACH SILO UNLOADER

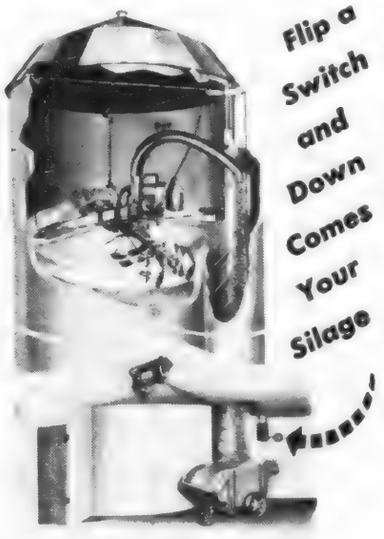
My Leach Silo Unloader and Barn Cleaner are two of the best labor-saving machines on my farm. My silage is much better feed when thrown out of the silo by the machine, resulting in higher production.
ADOLPH ZICK, Kingsley, Penn.

I have two 16x50 silos on my farm and feed about 70 head of dairy cattle. I have had a Leach Silo Unloader for 5 seasons, and if I couldn't get another one, you couldn't buy mine for three times what I paid for it. I believe that the Leach Unloader is one of the best-paying machines on the farm.
HENRY C. WACHHOLZ, Cologne, Minn.

I have had a Leach Silo Unloader in my 14'x80' silo for 4 years and wouldn't want to be without it. Previously I lost up to 6 steers a year due to spoiled silage, but haven't lost a steer since. The Silo Unloader mixes the silage so thoroughly that no one steer can get too much moldy silage. The machine also chews up frozen silage so that there's no chance for the cows to eat chunks of frozen silage. It's a wonderful machine.
R. S. CAMPBELL, Camden, Ohio

Last fall we installed a Leach heavy duty Silo Unloader. This unloader was equipped with disc attachments to permit more efficient operation in grass silage. This unloader has given very satisfactory service. It is a wonderful time and labor saver and should be considered standard silo equipment.
CHARLES SWIFT, Elburn, Ill.

I have used my Leach Silo Unloader for three winters and it has never given me any trouble. Has proven itself this past winter more than ever, because it has removed silage from my silo when some of the neighbors had to stop feeding silage because it was too hard to remove.
DONALD HUNT, Avalon, Wis.



Flip a Switch and Down Comes Your Silage

LEACH Barn Cleaner & Silo Unloader

MAIL THIS COUPON

LEACH CO.
450 South Main Street, Oshkosh, Wis.

Please send me the following as checked:

☐ Silo Unloader Literature ☐ Barn Cleaner Literature

MY NAME .....

Post Office .....

Route ..... Box No. .....

Township .....

spend the three winter months in Florida, he simply skips one batch.

Because of its low labor requirements and because the work is suitable for children and older workers, the broiler business is less likely to be upset by the current farm labor shortage than most other farm enterprises. With the exception of the giant producers who turn out more than 100,000 birds annually, most farmers can handle their flocks with family help.

Another possible solution, especially in a strong broiler market, is the installation of automatic feeders which operate on a conveyor-belt principle. It is claimed that the greater expense and food wastage adds about a cent and a half to the cost of raising a bird with the automatic feeder, but it does cut out about three-quarters of the feeding work, and feeding is the biggest daily job.

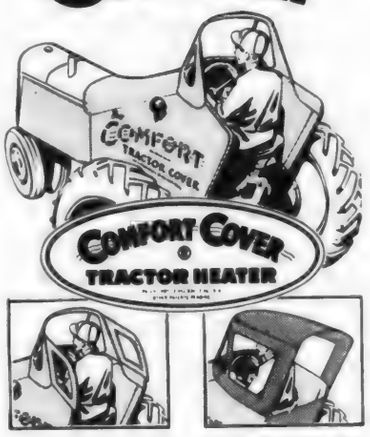
A neighbor of Hall's, Ralph Walker, who turns out 80,000 broilers a year on his neat 30-acre place uses the automatic feeders and finds that they save him two hours a day. "We fill the hopper on the feeder morning and afternoon and set the electric clock to operate the feeder twenty minutes out of each hour," Walker says. "When they first installed it the chain kept breaking and was a headache. I guess that it was made of steel that was too soft. Anyway, they replaced the chain and it works fine now."

With the actual feeding being done automatically the farmer keeps the feeder filled and occasionally carries grits to the hoppers in the pens. Grits, oyster shells or, better still, insoluable granite, improve the efficiency with which feed is turned into flesh.

Walker is trying another labor-saving trick that has the neighbors speculating about the risks. This is the use of deep litter. During World War II poultrymen who simply couldn't afford the labor to clean coops as often as they once did found that the birds thrived on old litter. Later, scientists proved that the birds were picking up vitamine B_{12} from the litter, which accounted for their excellent growth. Now B_{12} is added to the feed that he uses, but Walker still intends to take advantage of the labor-saving that can be made with deep litter. He is adding new litter when needed and stirring it into the old with a garden tractor type machine with a rotary tillage device. One drawback he has found has been that the roar of the engine stirs up the chickens almost as much as the tines stir up the litter. He is considering the practice of conditioning his birds to noise by having a radio run full blast all day in the coop, a device used by some of the other broilermen. Walker's neighbors are slow to approve the deep litter idea for they are certain that it will lead to higher mortality from disease. Walker believes that a fair trial of the system will prove them wrong and is taking the risk.

With part of the chickens being fed automatically and all of them on deep litter,

On Coldest Days—Work In COMFORT



NEW WINDSHIELD EXTENSIONS-optional at small extra cost.

ALL-WEATHER TOP & BACK PANEL-optional at small extra cost.

For winter tractor work—keep warm with the genuine COMFORT Cover—the tractor heater that more farmers use than any other. COMFORT gives you features you want—smooth streamlined fit, converts to low cost heated cab. Ask your dealer or write manufacturer.

Here's What COMFORT Owners Say:

George F. Varian
Schenectady, New York

"I use my Ford 8N for commercial snow plowing and farm plowing and couldn't get along without my COMFORT Cover. I tested and found it was 20° outside — and it was 70° inside my COMFORT Cover. I have less colds and my feet keep warm. I should of had a COMFORT Cover before."

Manufactured By
COMFORT EQUIPMENT CO.
2609 CC WALNUT KANSAS CITY, MO.

Raise TURKEYS THE NEW WAY!

Write for free information explaining how to make up to $3,000 in your own backyard. *Address:*

NATIONAL TURKEY INSTITUTE
Dept. 145 Columbus, Kansas

KILL EVERY RAT!

"Effective!" "Inexpensive!" "Kills 'em all!" That's what farmers say about WARFARAT, the new Dr. Hess *warfarin* product, a prepared rat bait that's as attractive to rats as it is deadly. Rid your place of rats the safe, easy way—for free bulletin on rat and mouse control, see your Dr. Hess dealer, or write Dr. Hess & Clark, Inc., Ashland, Ohio.

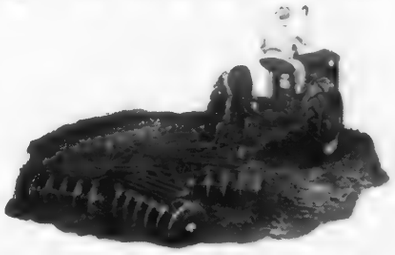
Dr. HESS WARFARAT

SCIENTIFIC *FARM-ACEUTICALS* SINCE 1893

Can You Do All This?

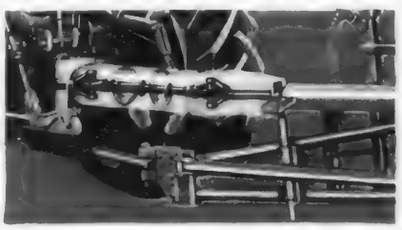
Hook up from tractor seat. You can, with Eagle Hitch of Case "VAC" Tractor. Just latch on, slip in one pin, and GO! Not only rear-mounted plows but a whole list of Latch-On harrows, planters, tool-bar tillers, etc.

Plow at even depth in uneven ground. Free-floating action lets Latch-On moldboard plows hold their depth without help or hindrance from hydraulic control. Handy turnbuckle sets suction for self-control of depth.



Use hydraulic control for pull-type implements and machines. Two-way valve (optional extra) provides double-action control for harrows, grain drills, combines, corn pickers, etc., fitted for ASAE standard remote ram.

See what you are doing when you cultivate. Look-ahead cultivators for Case "VAC" Tractor are front-mounted on Master Frame. They go where you steer, *when* you steer. You can work fast and clean, yet dodge stray stalks.



Run power take-off shaft straight back from tractor. Right-height, center-line power take-off on "VAC" Tractor means easy hook-up, less power loss, less wear on joints, less telescoping, better performance on turns.

Haul heavy stuff without lifting. Latch-On Utility Carrier loads like a stoneboat. Roll barrels, etc., right on it—raise with hydraulic control—go anywhere—let load down. Carries feed, fertilizer, machinery, most anything.

A lot of tractor for your money. See what you get in the low-cost "VA" Series. You get a big, lusty engine with power to do its work at moderate speed, pull full load when slowed down. You get weight and balance for sure-footed traction and steering. You get gear speeds to hustle work with 2-plow implements, 5 or 6-foot combine, one-row corn picker.

Eagle Hitch gives you the convenience of 3-point hook-up plus depth control you never saw before with rear-mounted implements. You get one-minute hook-up to most Latch-On implements. Among those not shown are 2-way and disk plows, planters and lister, disk bedder and cultivator, mower, and tool bar that makes up into many implements.

Plow stony, stumpy fields without damage or lost time. Mounted Break-Away Plow lets go when it hits obstacle—recouples automatically when you back tractor. Hydraulic control lifts plow over obstacle, and away you go.

See your Case dealer. Arrange for a demonstration of Eagle Hitch performance. And remember—there are 21 great tractors in four power sizes.

SEND FOR NEW TRACTOR BOOK TODAY

Mark items that interest you; write in margin other machines you need. Paste on postcard and mail to J. I. Case Co., Dept. J-90, Racine, Wis.

☐2-plow "VAC" Tractor ☐4-5 plow "LA" Tractor
☐Larger 2-plow "SC" ☐Automatic Baler
☐3-plow "DC" Tractor ☐Forage Harvester

NAME_____

POSTOFFICE_____

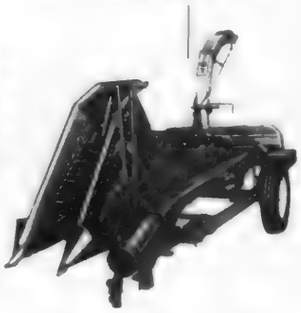
RFD_____ STATE_____

Only in the FOX

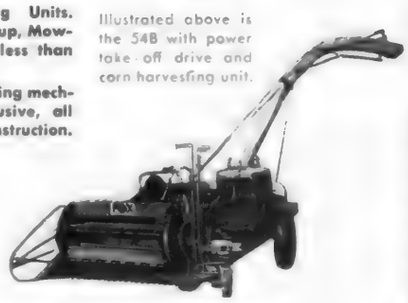
The new FOX is 700 lbs. lighter, 18" shorter, yet it has greater capacity, greater strength and many new features.

. . . can you change to pick-up, mower bar or corn harvesting unit in less than 10 minutes. The new FOX is the result of more than 20 years' experience in manufacturing pick-up hay choppers. Special features not found in other forage harvesters:

- Safety cutting principle — positively protects machine against damage by stones — foreign objects.
- Easily and accurately adjustable cutting bar.
- Quick-change Harvesting Units. Can be changed to Pick-up, Mower Bar or Corn Unit in less than 10 minutes.
- Perfect alignment of cutting mechanism assured by exclusive, all steel, one-piece frame construction.
- Large oversize tires.
- Quick-change knives.



Illustrated above is the 548 with power take-off drive and corn harvesting unit.



The pioneer grass silage harvester with a 5 ft. mower bar and individual power unit.

FREE WRITE TODAY FOR NEW CATALOG.

FOX RIVER TRACTOR COMPANY

The Pioneer of Modern Forage Harvesting

5951 North Rankin Street

APPLETON FOX WISCONSIN

Walker and his wife are able to care for broilers in batches of twenty thousand and to take care of their seven-acre orchard and truck gardening as well. "With this arrangement," he says. "Mrs. Walker and I feel that we can live just as well as we did on our 200-acre farm with a lot less work. We started in broilers on the old place. It was a sideline with us there, but we liked it so well we felt we could make it our main source of income. There is a lot to learn though: I don't know how long it took us to catch onto the trick of closing off each end of the coop with paper when the chickens are young and don't need the space. The paper costs us a few cents and saves us dollars in fuel bills and makes the center section where the chicks are kept easier to heat. This is the sort of thing you never learn from a book—you invent it yourself or pick it up from your neighbors.

"And, speaking of heating," Walker added, "we had a real experience here last year. We plan to start our chicks off at 95 degrees and lower the heat at the rate of about five degrees a week until they are six weeks old. During the winter we keep the heaters going enough to hold the temperature at 60 degrees after the chicks reach six weeks. Well, last winter the railroad strike caught me short of bottled gas and my heaters went out on me. The chicks were just five weeks old and the temperature outside was below zero, but not too cold to keep me from really sweating. You know, I didn't lose any from cold. I figure that if it had been a week or even a few days sooner I would probably have lost the lot of them."

Converting Old Buildings

The cost of converting a barn depends on its condition and on such items as whether or not there is flowing water piped to it and how many floors are to be added. Where new siding was not necessary, water was present, and no floors were added, a barn capable of handling 5,000 chicks has been converted for as low as $400.00 with stove heat and hovers. If the new automatic space heaters were to be used, this job would have cost around $1,200. These space heaters are equipped with a fan to blow the air, heated by bottled gas, through the coop. With the space heater the whole room is heated. Farmers claim that these heaters keep the litter dry, make crowding and piling up of chicks a rarity, make the entire room area comfortable so that the chicks are out eating rather than crowding under the hover, make working in the coop more pleasant, prevent freezing of water pipes, and are safer as fire hazards.

In figuring the capacity of a building, the common practice is to allow from three-fourths to one square foot of floor space per bird. Ventilation, which is an item of prime importance, is figured at one-tenth as much window space as there is floor space. In building new buildings for broilers, a 5,000-bird unit will take at least 115 by 32 feet of floor space and 375 square feet of windows. In addition to the windows there will probably be other roof-type ventilators.

These figures are more or less axiomatic among broilermen, but the best type of construction is debated endlessly. Almost everything has been tried: buildings with peaked roofs, hip roofs, shed roofs, and quonsets; open front with rear windows, windows on both sides, windows on one side only; one, two, three, and even four floors; brick, clay tile, cement block, frame, and composition. The building plan will be determined partly by the climate and partly by the taste of the builder; his choice of building material may be dictated by the economics of the situation. The principal objection to frame and tile construction is the expense. They are satisfactory from the viewpoint of the chicken itself, however, that likes a building which is warm (95 degrees the first week, five degrees less each week until the temperature reaches 60 degrees), dry, and draftless. Quonsets are good, especially in the matter of heating. Concrete blocks are poor—they are too damp, and are hard to heat.

One of the most popular building materials being used today is a fiber board called Homosote which comes in 8 by 14-foot sheets. This material, which is used for both roofing and siding, sells for about eight cents a square foot, or about two-thirds the cost of frame construction. Another sav-

"WYETH NEWCASTLE VACCINE IS CHEAPEST PROTECTION I CAN BUY"

Dr. C. L. Wertsch, prominent optometrist in Lititz, Penna., who raises broilers on his farm near this town.

"NO SET-BACKS AND BIRDS ALL WEIGHED OUT FINE!"

Benjamin B. Brubaker

NO "NEWCASTLE" IN OVER A YEAR

LANCASTER, PENNA.—For over a year now, Benjamin E. Brubaker has had no Newcastle Disease among his chickens. He has been using Wyeth "Killed Virus" Newcastle Disease Vaccine, having the chicks vaccinated when one day old at the hatchery.

Prior to using Wyeth Vaccine Mr. Brubaker used other vaccines on the market, and losses ran up to twelve percent and more. "Now," he says, "there's just no 'Newcastle' on the place, and the weight gains of my broilers have been sensational.

"Recently I marketed a batch of 5,000 broilers at ten weeks and two days . . . averaged 3.55 pounds right straight through and my feed cost was 21 cents a pound. I'm sticking to 'Killed Virus' Vaccine."

LITITZ, PENNA.—Dr. C. L. Wertsch, owns a prosperous broiler plant near here in Brickerville, where as a side line to his business as an optometrist, he raises about 40,000 broilers a year. He is planning to expand facilities soon, to double this output.

Dr. Wertsch has been using Wyeth "Killed Virus" Newcastle Disease Vaccine for nearly a year now, and losses from all causes have remained well under two percent.

"Darned cheap insurance, I'd say," Dr. Wertsch stated recently when interviewed here. "Before trying Wyeth 'Killed Virus' Vaccine, I used several other types of vaccines and during this time my losses ran around twelve percent . . . often much higher. It was a pretty sad experience for me, I can tell you.

"Last batch I had on live virus vaccine was the sorriest looking bunch of chicks you ever saw. I'm certainly staying with Wyeth 'Killed Virus' Vaccine. No weight set backs . . . and the birds weigh out fine when marketed."

VACCINATES MILLION BROILERS WITH WYETH "KILLED VIRUS" VACCINE

DOVER, DEL.—Dave Greene, owner of the Dave Greene Feed Company and 35 chicken farms in this area, raises close to two million broilers a year. He first started using Wyeth "Killed Virus" Vaccine for Newcastle Disease in May, 1950. Since that time has vaccinated over a million broilers with excellent results.

Here's what he said when interviewed recently: "This is certainly a nice way to handle broilers. With Wyeth vaccine you don't get set backs in weight gains. The birds keep right on gaining. It's the most satisfactory method I've tried —and it's kept my losses very low.

"I tried other types of vaccines," Mr. Greene said, "and it just didn't seem to do a bit of good. I had losses up to 40 percent from Newcastle many times. The broilers gained weight poorly, too, just at a time when it is most important for them to put on flesh.

Dave Greene

"Wyeth 'Killed Virus' Vaccine is certainly the cheapest protection a broiler-man can buy. I'm certainly sticking to Wyeth Vaccine for Newcastle. Yes, this vaccine is just like an insurance policy to those of us in the chicken business."

Mr. Greene is well known throughout the famed Del-Mar-Va Peninsula for his modern methods employed in raising market broilers.

WYETH "KILLED VIRUS" NEWCASTLE DISEASE VACCINE HAS EXTRA SAFETY FACTOR

Wyeth Vaccine contains a special type of aluminum hydroxide gel as a carrier, which has proven effective in stimulating prolonged and increased immunity by delaying absorption. This builds resistance over a much longer period of time. "Killed Virus" Vaccine Wyeth has never introduced Newcastle Disease or any other disease into poultry flocks!

CONSULT YOUR VETERINARIAN AS YOU WOULD YOUR PHYSICIAN

Wyeth Incorporated • Philadelphia 2, Pa.

Wyeth®

GET A SURE STAND OF GRASS WITH LESS SEED

THIS BRILLION Sure-Stand Grass Seeder and pulverizer seeds grass within the top half inch of a fine, firm seedbed . . . gives every seed an opportunity to germinate and grow into the grass you want.

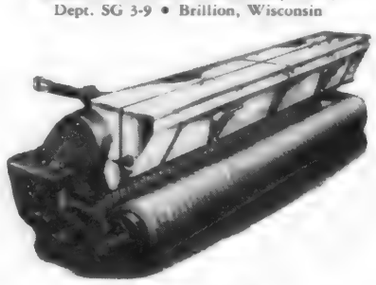
Note how this seedbed is free from lumps which have been crushed by the front roller. A metering device accurately counts out the seed.

After the seed is dropped on the pulverized seedbed, a rear roller covers the seed to a maximum depth of ½ inch, and gently packs the soil around it. The result is a uniform seeding at the rate desired—no wasteful overseeding — and the seeds themselves are in contact with moist, nourishing soil where they can germinate quickly.

The Brillion Sure-Stand Seeder does this all in one simple operation — one time over the field. If you are broadcasting seed, or seeding with grain drill, which allows seed to fall onto rough ground or open spaces between lumps, it will pay you to get the Brillion story.

Farmers report saving enough seed the first year to pay for a Sure-Stand.

BRILLION IRON WORKS, INC.
Dept. SG 3-9 • Brillion, Wisconsin



Brillion
SURE-STAND SEEDER
"TUCKS EACH SEED TO BED — IN THE TOP HALF INCH OF SOIL."

ing is in the cost of construction. Once the necessary frame underpinnings are up, two men can complete siding and roofing for a 5,000-bird building in a day. Some of these composition-covered buildings are substantially unchanged in appearance after 12 years of use.

Another problem which cannot be overlooked is the water supply. Even with the use of automatic watering cups that operate with a minimum of waste, 5,000 broilers will drink 270 gallons of water daily at 11 weeks. Such heavy drinking may require drilling of a new well, the cost of which will increase the investment.

In the major broiler areas, the Delmarva Peninsula of Delaware, Maryland and Virginia, North Georgia, Northwest Arkansas, Texas, the Shenandoah Valley, Eastern Connecticut, or North Carolina, marketing information is published and broadcast daily. In other areas the county agent, broiler dealers, other broiler raisers, and food dealers will be the best source for general market information. Hobart Hall and his neighbors get their market reports daily from the radio and from newspapers. If they cared to they could write the nearest Production and Marketing Administration Office and have the daily market report mailed to them. This report gives a complete summary of all of the markets nearest the issuing office and also of the national markets.

Profits

Hall and his neighbors stay up late the night they ship. When the birds have bedded down they go out into the coops and load them into crates. Long after midnight they stretch their legs and try to straighten aching backs and wave the truck off to Dayton or Indianapolis or Louisville or St. Louis, wherever the market is strongest. There the birds will be sold either to commission houses which deal in live broilers or to dressing plants.

Some packing companies are contracting for broilers in advance and guaranteeing a price. The formula for arriving at the price in one of these arrangements is as follows:

A. For each chicken delivered, an amount equal to the average purchase price per chick in the brood computed with a mortality allowance of 5 per cent of the number of chickens purchased.

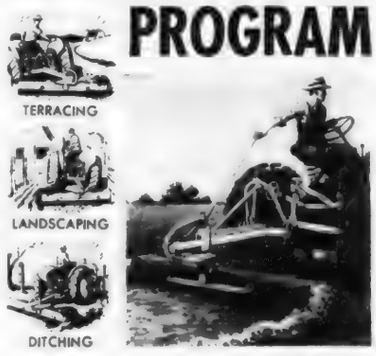
B. The actual cost per pound of all feed used allowing 3.4 pounds of feed for each pound finished live weight.

C. An allowance of two cents per pound for expense of fuel, lights, litter, medication, etc., for each pound finished live weight.

D. An allowance of six cents per chicken delivered for Grower's advance profit.

This system also calls for a share of the company's profit on all birds handled. Contract marketing has not been too popular with the broilermen who would rather run the risk of losses in order to try for the higher profits on the open market during the period of high prices.

Your Individual SOIL CONSERVATION PROGRAM



Needs this All-Purpose Blade

Big Farm Production ahead. The Danuser Blade is truly an all-purpose soil tool that helps meet the labor shortage — terracing, ditching, grading, bulldozing, scraping, backfilling, cleaning snow, windrowing manure etc. Easily controlled from tractor seat — raise — lower — turn to any angle. Write for literature describing application to your tractor:

DANUSER MACHINE CO.
505-09 E. Third St. Fulton, Mo.

DANUSER ALL PURPOSE BLADE
Tested and Approved by Tractor Manufacturers

ROUEN DUCKS

1st Old Pair, Highest AWA "Gold Band" Award Boston, '51

The "Original" JOHN CONRAD Prize Winning Strain

Largest, most popular breed. Beautiful Wild Mallard colors; 9 to 12 pounds. Over 40 years breeding assures show winners for your fairs. Breeding stock for your farm. FREE 8 page Catalog. *Also better chicks bred by modern "Nickability" process.*

FREMONT JOHN CONRAD 11500 West Edgerton R. 11, West Allis, Wis.

HERE'S "GOOD HEALTH TO YOUR PIGS."

ANCHOR
ANTI-HOG CHOLERA SERUM

In every bottle of Anchor anti-hog cholera serum and virus—is dependable insurance against costly cholera. And with simplified Anchor vaccination, you save by doing the job yourself.

Wise farmers have learned to depend on Anchor's low cost protection—that's why "more pigs are vaccinated with Anchor Serum than any other brand."

GET YOUR SUPPLY TODAY

On sale at your neighborhood dealer's. Anchor vaccination costs only a few cents per animal . . . assures lifetime immunity from this No. 1 hog killer . . . bigger gains at market. Don't delay!

WRITE FOR helpful Anchor Booklet. Free on Request.

ANCHOR SERUM COMPANY
WORLD'S LARGEST SERUM PLANT
SOUTH SAINT JOSEPH, MISSOURI

Some of the Indiana broilermen have made as high as 42 cents a bird on large lots and have averaged 22 cents a bird over a period of a year and a half. In figuring their profit, however, they do not take out the cost of their own labor, only the cost of hired help. A more conservative long-time figure for profits is given by the experts who say that a broilerman should be able to make 10 cents a bird, figuring all labor used at 75 cents an hour.

In figuring profits, one farmer said, "I have been figuring 22 cents a pound as the break-even figure. With feed going to $5.90 a hundred the break-even figure should go to 24 cents a pound. This figure holds good if losses are held to three per cent. I've been pretty lucky with losses so far. I've sold more chickens that I bought every time. Since the hatchery gives you three birds extra for every hundred, that means I've held losses below three per cent. I've got a little coccidosis in the present batch, though, and I may not make it this time."

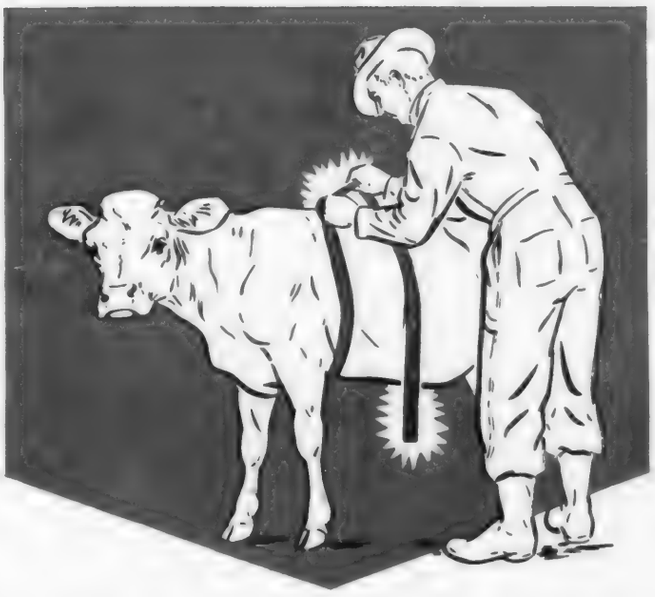
Rarely figured into the profit sheet is a factor that adds to the value of the farm itself, the manure. This high nitrogen manure is valued at around $20 a ton. Since most of the chicken-raisers import all of the feed and litter they use, the manure is adding fertility to the land rather than merely returning it. Hobart Hall cleans out some 30 loads of litter from the broiler house after each batch of chickens and spreads it on his grain land and pastures.

Risks

Disease is only one of the risks in this business. Raymond Stout, a banker of Orange County, Indiana, a sizeable broiler center, characterizes broiler credit as the most hazardous of all farm financing. "We will grant such loans," he said, "but only when the farmer has a good record and when at least 50 per cent of his quick assets, such as livestock and machinery, are debt-free." Part of this risk arises from the wide range of price variation in broilers. In the past two years prices have fluctuated between 16 and 40 cents a pound, while production cost remained steady at 20 to 25 cents a pound. These price fluctuations have been largely seasonal: recent Christmas season prices have been so unfavorable that many farm management experts are advocating laying out during that 12-week period. Most farmers, however, feel that in-and-out farming never works.

The second risk factor, disease, the farmer attempts to control in many ways. Chicks are bought from hatcheries which get their eggs from pullorum-free stock and practice other control measures such as fumigating their incubators. The chicks are vaccinated against Newcastle disease at the hatchery with a killed virus vaccine that protects them through their short life. Coccidiosis is held within bounds with sulfaquinoxaline which can be mixed with the drinking water at the first signs of the disease. But the respiratory diseases, particularly bronchitis, still ruin many flocks. Some progress has been made in the laboratory in fighting bronchitis with germicidal lamps and germ-killing vapors, but in actual operation rigid sanitation is the only answer at present.

When the costs and the risks and the farm's capabilities and the labor are all taken into consideration the whole question as to whether to go into broilers can be summed up in a kind of balance sheet. An Indiana farmer, Wilbur Hackney, made such an estimate of his situation and found that he had three of the "for" factors in his set-up: an old barn which could be remodeled at small cost, a farm which could be vastly improved if he could fertilize it more and cultivate it less; and a wife and young son who could be plenty of help with a broiler enterprise. The one factor against broilers was the availability of his own time. Hackney's dairy herd was producing Grade-A milk and he also drove a school bus in winter and ran a busy custom-baling enterprise in the summer. "I finally came to the conclusion that my cows weren't giving me enough return for an hour's work," Hackney said, "so I sold them. I replaced the dairy cows with feeder cattle and changed the old barn into four floors of broilers." Since then Hackney has built a two-story broiler house and is now producing more than 64,000 birds annually.



THIS PURINA WEIGHT TAPE might help you get 1000 LBS. MORE MILK PER COW. Yes, it's a handy tape that quickly gives you the weight of calves and cows . . . tells you when to breed heifers . . . lets you know if dry cows are gaining fast enough. We'll send you one for 20¢ if you'll send the coupon.

But how may it help you get 1,000 lbs. more milk per cow?

Well, it's part of the Purina Plan of building and holding condition. This plan was developed by 25 years of experimental work in our herd. It increased our production over 8,000 lbs. milk per cow. The new book "Building Herd Capacity" describes what we have learned. Want to look it over? It's free. Just send the coupon.

RALSTON PURINA COMPANY
St. Louis 2, Missouri

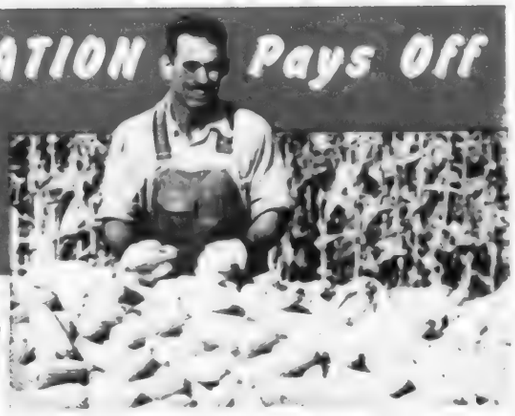
RALSTON PURINA COMPANY
1128 Checkerboard Square, St. Louis 2, Mo.

☐ Please send free 48-page Purina Dairy Book, Form No. D3200.

☐ If you also want a weight tape, enclose 20¢ and put a ✓ in this square.

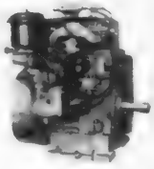
Name.....
Address.....
City.....State.....
Number.....and Breed.....of cows kept.

STANDARDIZATION Pays Off
...for the Corn Farmer

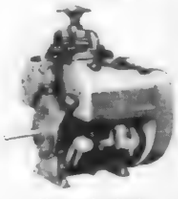


and for the WISCONSIN ENGINE User!

Single cylinder 3 to 9 hp.



Two-cylinder, 7 to 13 hp.



V-type 4-cylinder 15 to 30 hp.

Corn growers know that selecting the *best varieties* of seed pays off in higher corn yields. In the same way, experienced engine power users know that it pays to *standardize* on Wisconsin Air-Cooled Engines.

When the going gets tough, Wisconsin *heavy-duty power* shows its true value. As the load increases and the engine slows down, the *pulling power* of the engine actually increases to take care of the extra load. (Engineers call this "torque build-up").

For example, a Wisconsin VE4 engine powering a Combine and governed at 2200 RPM, could be slowed down in tough going to 1600 RPM, at which speed the engine delivers the maximum torque (pulling power). This extra-load performance is one of the results of Wisconsin heavy-duty design and construction . . . and one of a number of good reasons why it pays to *standardize* on Wisconsin Air-Cooled Engines.

So look at the engine as well as the machine. STANDARDIZE on Wisconsin Engine Power . . . 4-cycle single cylinder, 2-cylinder and V-type 4-cylinder, in a complete power range from 3 to 30 hp.

Write for free copy of our latest catalog.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

more farmers prefer the...

GEHL
SINCE 1859
PRONOUNCE IT "GALE"

Forage Harvesters

Yes, Gehl sells more forage harvesters than any other specialized implement manufacturer . . . and the Gehl has *more years of proved performance* back of it than most forage harvesters. Thousands of users agree that the Gehl leads in better cutting, all-'round performance and *value per dollar*. Built to stand up year after year.

Like Gehl feed cutters and silo fillers, famous since the days of the first silos, the Gehl Forage Harvester cuts *uniformly, clean and fast* . . . no shredding. Does an equally fine job in windrowed hay, corn or other row crops. Mower-bar attachment also available. Either motor or power take-off drive. Saves many man-hours and back-breaking work.

Gehl Equipment Does the Complete Job . . . From Field to Storage!

GEHL BLOWER elevates forage to the highest silo or mow. Can be equipped with power take-off to operate new Gehl Self-Unloading Wagon and others.

You can get . . .

FREE PLANS for making your own wagon, using Gehl parts kit. *Write today* for *Free* illustrated wagon plans, Harvester Booklet and dealer's name.

GEHL BROS. MFG. CO.
Dept. MH-592, West Bend, Wisconsin

There's Nothing Better Than a GEHL!

A few miles away, Earl Newlin's farm was so geared that his balance sheet showed a different picture. A successful dairyman with a herd of almost 100, Newlin also feeds 200 hogs annually and keeps laying hens. He had no available buildings, a water supply that would not accommodate broilers without additional wells, and a family and hired help that were already profitably occupied. "Oh, I thought about it," he said, "but there were just too many things against it. I finally gave up the idea and I'm not sorry."

Each farmer will have to figure his own balance sheet. If he feels that the chicken is the most aggravating creature on God's earth, he should stay away from broilers and avoid a lifetime of frustration. If, on the other hand, he likes chickens, and has the extra time, capital or credit, buildings, and water and lives near a good market, he may find the balance sheet adding up to broilers.

THE AUTHOR: Janice Turner is the wife of an Orleans, Indiana, farmer. She was born four miles from the farm where the Turners now live. Graduating from Indiana University in 1945 with a degree in journalism, she went to work as the editor of the Saturday magazine section of the Lafayette *Journal and Courier*. After three years she went home to marry a childhood sweetheart, and as a result she now combines writing with tractor driving and cooking.

FIGHTING BULLS

(Continued from page 65)

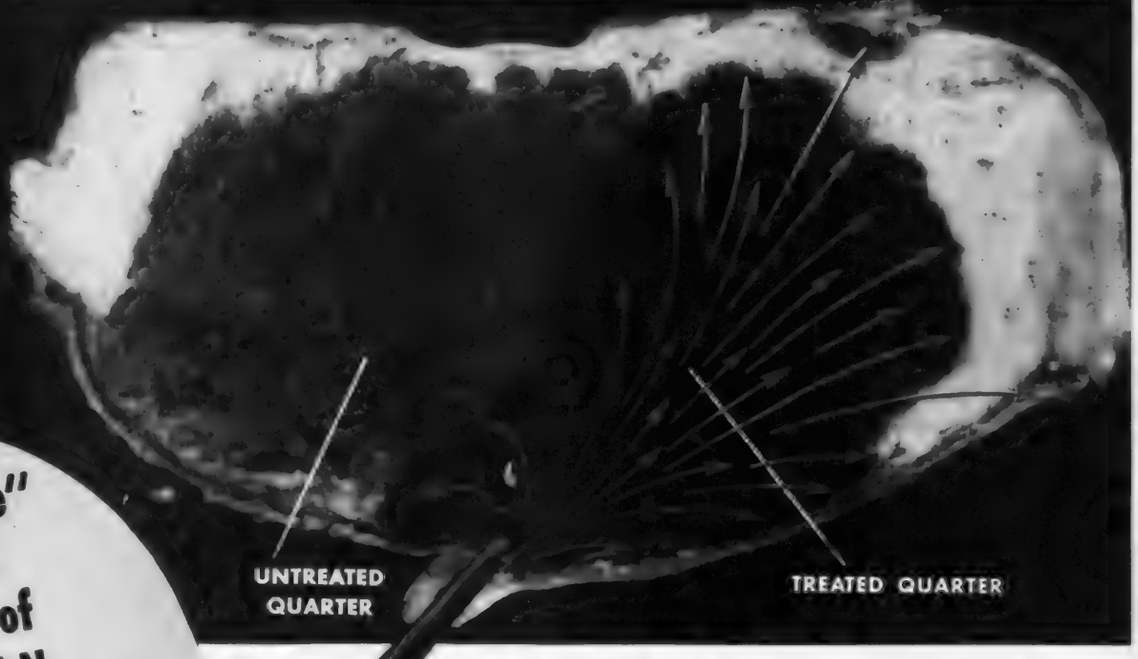
round him with oxen. Then, finding himself part of a herd again, he usually calms down and can be driven with the others to a field that joins the loading chutes. Here a veterinarian from Aftosa (foot-and-mouth disease) Commission gives the bulls a gingerly inspection in order to certify their freedom from the disease.

The Commission has established a quarantine line which runs between the cities of San Luis Potosi and Aguascalientes. Though *La Punta* lies on the clean side of the line, practically every shipment of bulls has to cross the quarantine zone which calls for stacks of official papers, the bane of Don Pepe's existence. Not only cattle trucks but all vehicles must stop at the line. Passengers have to walk through a pit filled with shavings soaked in caustic soda while an attendant sprays the tires of their car.

The loading apparatus is simple and ingenious. The oxen lead the bulls through a long, narrow chute which ends in a series of covered concrete cells, each just large enough to contain a single animal. These cells are separated by sliding, wooden doors controlled by ropes from above. Grills in the roof make it possible to urge the animals from one compartment to the next with the aid of electric prods. One compartment has an extra gate for removing the oxen, another has as its floor a weighing platform, and the last one has walls that are perforated with a number of small windows on each side so that bulls may be treated for any minor injuries they may have received fighting among themselves or in the process of

Treat MASTITIS with the NEW, SQUIBB PENDISTRIN*

LOOK *INSIDE* THE QUARTER!



Note how Squibb Ointment Veterinary THOROUGHLY DISPERSES Pendistrin throughout a treated quarter. One tube, containing a dye instead of Pendistrin, was instilled into one quarter of a cow's udder. The cow was killed 17 hours later—the udder removed and frozen—and a cross-section photograph taken.

Each "instant-use" tube contains 100,000 units of PENICILLIN plus 100 mg. of DIHYDRO STREPTOMYCIN

...a potent treatment for mastitis

Dairymen are saying, "The new Squibb PENDISTRIN is the best treatment for mastitis we've yet found."

This is the reason for the effectiveness of PENDISTRIN:

It is a high-potency combination of two antibiotics—containing 100,000 units of penicillin plus 100 mg. of dihydrostreptomycin.

This potent combination of antibiotics is carried in an ointment base. The ointment has the proper melting point and floats up with the milk in the udder, *thoroughly dispersing* the combination of antibiotics to all parts of a treated quarter. These antibiotics remain active against mastitis up to 72 hours.

PENDISTRIN is stable, non-irritating, won't discolor milk. It comes in the infusion-tip, "instant-use" tube. It requires no refrigeration—can be stored on the farm ready for instant use.

Ask your druggist for Squibb PENDISTRIN. Keep it on hand! Write for special literature on PENDISTRIN. E. R. Squibb & Sons, Veterinary and Animal Feeding Products Division, Dept. FQ-F,745 Fifth Avenue, New York, N. Y.

For the most common kind of MASTITIS
SQUIBB PENICILLIN OINTMENT

Streptococcus agalactiae is the cause of 85 to 90% of all mastitis cases. For this most common kind of mastitis, use Squibb "Instant-Use" PENICILLIN OINTMENT...the treatment that has proved successful in millions of cases of mastitis!

For accurate diagnosis of mastitis, consult your veterinarian.

**a trademark of E. R. Squibb & Sons*

SQUIBB—A NAME YOU CAN TRUST

A super spark plug at a regular price

AUTO-LITE

TRANSPORT
SPARK PLUGS

For less fouling, greater efficiency

Here is the spark plug built for farm jobs . . . proved by hundreds of hours of actual field operation. Whether your truck or tractor runs wide open or idle for hours, this rugged Auto-Lite Transport Spark Plug will give best performance. That's why it has been selected by so many leading truck and tractor makers as original factory equipment. See your nearest Auto-Lite Spark Plug Dealer soon. He handles Ignition Engineered Auto-Lite Resistor and Standard type Spark Plugs, too!

Auto-Lite Spark Plugs—Patented U.S.A.

Gives you lowest cost per mile of spark plug operation

AIRCRAFT TYPE INSULATOR— offers maximum resistance to heat and reduces fouling.

HEAVY ELECTRODES— give long gap life which contributes to lower service costs by requiring less frequent gapping.

RUGGED CONSTRUCTION— especially suitable for the most severe farm operation.

Tune in "Suspense!" . . . CBS Radio Mondays . . . CBS Television Tuesdays

SEE YOUR LOCAL DEALER

loading. From this compartment they step directly into the large wooden shipping crate which is already loaded on a truck. The crate is closed and the truck moves ahead a trifle to bring another crate even with the chute.

When the bulls leave *La Punta* they are leaving what amounts to a small village. *La Punta's* buildings were erected upon the remains of an old Spanish hacienda which dated back to colonial times. Its high, thick adobe walls give it the appearance of a small fortress, which is what it was in the rough and ready pioneer days following the Spanish conquest. The ranch has belonged to the Madrazo family for almost a century and its brand has been in use for many hundreds of years.

Peafowl are raised for fun and poultry for domestic use. A pond close by the main buildings provides a swimming pool for ducks and geese. The more remote regions of the ranch, including a range of low mountains, are used for raising 35,000 head of Rambouillet sheep.

"A sideline," says Don Pepe!

The 25 cowboys live with their families in adobe houses nearby where life goes on in a quiet pattern that has changed but little in centuries. The women carry water from the spring to their homes in earthenware jars and wash their laundry in a stream. The children start riding as soon as they are able to sit up straight. The cowboys themselves dress and ride in a fashion that is rarely seen today except in western movies.

But the never-ending activities of *La Punta* are all centered around the fighting bull. There in the silent desert he lives four undisturbed years. After leaving his home for the first and last time, he is driven or flown to the bull ring where he is uncrated and allowed to rest for a few days.

On the day of the fight, as he is about to enter the arena, he is penned in a *toril* or bull-cell. The colors of his owner are fixed to his hump with a steel barbed rosette. Finally the doors of the *toril* are flung open and he is allowed to charge out onto the red earth of the arena and face his hated opponents with all of the rage that has been bred into him. He is wounded by the iron-tipped pike of the *picador* and occasionally has the satisfaction of heaving *picador* and his padded horse into the air with his horns. He is pierced by the brilliant darts of the elusive *banderilleros*. Finally, maddened with pain and tired with loss of blood, he is cleanly dispatched by a single thrust of the *matador's* sword.

THE AUTHOR: Richard Grove is a native of New Jersey, but after a spell as a meteorologist during World War II in the U. S. and the South Pacific, he transplanted himself to Mexico. For the past five years he has been studying and writing in that pleasant land. When he was courting his wife he took her to a bullfight and since then they have both become *aficionados*. His story "Fighting Bulls" grew out of his interest in this manly art.

HYDROPONICS

(Continued from page 31)

Gericke began thinking of the mechanical function of the soil when he was searching for the answer to a particular problem. One season he had produced potatoes in his beds at the phenomenal rate of 2,400 bushels to the acre, but had never been able to come close to this yield again even though he thought he had duplicated all of the conditions that made the big yield possible. As he puzzled over the mystery, his wife reminded him that in the season of his record crop he had mowed the lawn and dumped the grass clippings on the potato bed. Gericke was sure that the grass hadn't added any nutrients to the tank and wondered if it could possibly have been the weight that had made the difference. To find out, he dumped bricks on the litter in which the potatoes were growing and again he achieved a record crop.

Since then Gericke has been studying what a farmer might call the tilth of his litter bed. "Every scientist knows what nutrients are needed by, let us say, spinach, but no one has ever bothered to find out what consistency of the soil spinach needs to grow roots most effectively.

The discovery of this root-shaping function of the soil he considers revolutionary. "Take a carrot, for instance," he continued. "It needs heavy compact matter. In light litter you get many small roots. Since it's the roots we eat, we want them big. So we grow them in good solid matter that offers resistance to grow against. But lettuce wouldn't grow well in such heavy litter—its fibrous roots need a lighter seedbed such as sawdust. Then you have to consider the climate. In dry seasons the litter should be made of something that will hold water to moisten the upper parts of the roots that stick in the solid matter. In wet seasons you need coarse litter that drains well, rice straw for instance. These are just rules of thumb. You've got to watch the crops and do what's needed—just as a farmer does with his crops on soil. But make no mistake about it, preparing the seedbed is the most important part in hydroponics."

Though his multiple-crop system and his high yields have been confirmed by other scientists, Gericke's methods have not been received with unmitigated enthusiasm by others working in the field of soilless agriculture. In general their complaint is that no one else has Gericke's green thumb. "Dr. Gericke has never been excelled in production," a fellow scientist said recently. "The trouble is that no one else using his methods has had the skill to come even close to equaling his production. More specific criticisms are that few have been able to maintain the nice balance between air space and liquid below the seed bed which permits proper aeration. Most experimenters who attempted to duplicate

Ideas for the Farm

FOR MORE INFORMATION ON IDEAS DISCUSSED HERE, SEE END OF COLUMN

Bright Roof Preserver One coat of asphalt-aluminum costs little, lasts a long time, and has the extra advantage of reflecting summer heat—important in keeping livestock healthier. Use it on rolled asphalt or rustable metal roofs. And when you buy, look for the Warranty Seal that assures the right amount and grade of aluminum pigment in the right vehicle. Ask your dealer for his "Warranty" brand. Folder sent on request.

Pasturage Is A Money Crop if you count the cost of supplemental feed. To cut that cost, use a portable irrigation system. Pastures stay green from early spring to late fall. One test shows cows get 35% more grazing, produce 35% more milk. Portable irrigation systems extend the growing season of all crops. When you buy, insist on strong, rust-proof Reynolds *Lifetime* Aluminum pipe...weighs only 16 lbs. per 20 ft. length. Illustrated 12-page folder on irrigation sent on request.

Locker Plant Operators know the best way to wrap foods for freezing. They do it quickly, with no taping or tying, because they use Reynolds Aluminum Locker Wrap. These experts will tell you the end-result is better...practically no shrinkage or flavor-change. Cannot absorb juices or stick to product. Economical. Insist on this aluminum foil in your freezing. Illustrated folder on request.

.....

FARM INSTITUTE Reynolds Farm Institute,
Box 1800-C2, Louisville 1, Ky.

Please send literature on: Irrigation ☐; Locker Wrap ☐; Insulation ☐; Roof Coating ☐; Corrugated ☐; 5-V Crimp ☐.

Name .....

Address .....

Moving Day Comes Regularly with your portable hog houses, chicken shelters, etc. They're much easier to move if built with aluminum roofing and siding. Yet this lighter metal has the solid strength you want on big barns, too. Wherever you use aluminum you can depend on lowest maintenance—no painting. Your poultry and livestock will be healthier because it's cooler under aluminum. Ask your dealer for Reynolds Lifetime Aluminum Corrugated and 5-V Crimp. Folder on request.

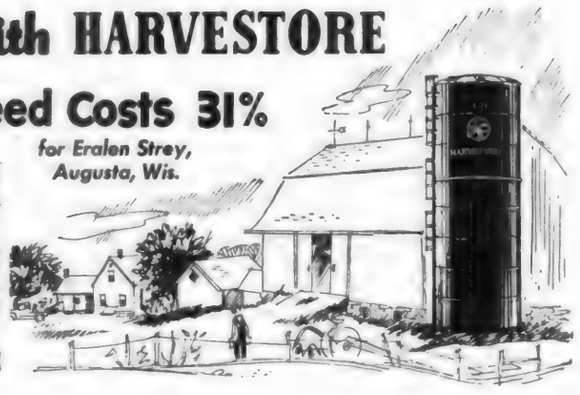
Turn Off The Heat is just what you want to do to keep milk or egg production up in summer, put weight on hogs. And that's just what you do with Reynolds Aluminum Reflective Insulation, tacked or stapled under roofs and inside walls of barns, poultry houses, hog shelters—or your own home. Aluminum foil on kraft paper, it reflects up to 95% of radiant heat. 250 sq. ft. in one 15-lb. roll. See your dealer. Ask for free folder.

Military requirements for aluminum affect total supply of these products. But production capacity is expanding. Keep asking your dealer.

A.O.Smith HARVESTORE

Cuts Feed Costs 31%

for Eralen Strey, Augusta, Wis.



From DHIA sheets going back five years in a running record of his operations, Eralen Strey of Augusta, Wisconsin, determined that before he had his HARVESTORE, feed costs per hundred pounds of milk ran to $2.14.

After his HARVESTORE was in use, cost for feed went down to $1.47 per 100 pounds of milk produced.

That's a saving of 67c per hundred pounds of milk—and Strey's herd produces around 20,000 pounds a month.

That's a saving of 31% in feed costs, gained by cutting out concentrates that are not needed when feeding pickled pasture from the HARVESTORE.

"With a record of this kind," Strey writes, "you may be assured that the installation of the second HARVESTORE is in my future plans."

Additional Reasons Why You Should Own a HARVESTORE

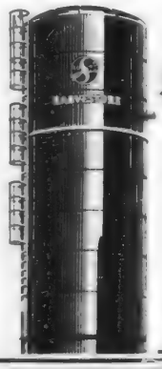
STOPS SPOILAGE! Sealed construction keeps out air that causes spoilage, heating, nutrition losses. Saves "spring pasture" values for year 'round feeding.

SAVES WORK! Mechanical bottom unloader saves hundreds of man hours every year. Ends daily climb to pitch out silage.

NO MAINTENANCE. Smooth glass-surfaced steel, inside and out—no rust or corrosion—needs no painting or upkeep.

NO FREEZING PROBLEM! Delivers feed at any temperature.

MORE PROFITS! HARVESTORE gives you a better system of farming. Makes summer feeding practical. Promotes better herd health—more milk—more beef—more dollars.



A.O.Smith CORPORATION
Milwaukee 1, Wisconsin

HARVESTORE

Glass-Surfaced Steel Inside and Out

77th ANNIVERSARY 1874 1951

— MAIL THIS TODAY! —

A. O. SMITH CORPORATION
Dept. FQ-951, Milwaukee 1, Wisconsin

Without obligation, send me:

☐ Complete information on what the HARVESTORE can do for me.

☐ Information on where I can see a field demonstration of the HARVESTORE in my area.

*Name*_____

*R.F.D. Route*_____

*County*_____ *State*_____

HUBBARD'S

High-producing

NEW HAMPSHIRES

PEDIGREE-BREEDING GIVES YOU HEAVY EGG PRODUCTION AND LOW LAYING HOUSE MORTALITY

Don't be satisfied until you have tried Hubbard's New Hampshires—the high egg-production strain. You will find these strong, fast-growing chicks ideal for late summer or fall brooding profits.

In the bloodstreams of Hubbard's New Hampshires flow the benefits of 23 years of pedigree-breeding. This gives them vigor, high livability, fast uniform growth, high production of large eggs, as well as low laying house mortality.

For broilers, buy Hubbard's Quick-Meat Barred Cross Chicks of hybrid vigor, with superior meat qualities. All chicks U. S. Approved, Pullorum Clean and guaranteed 30 days.

FREE 24-Page Poultry Catalog

Tells all about our 30,000 Bird Farm and pedigreeing program. Write for a copy today!

HUBBARD Farms

Box 35, Walpole, N. H. *Branch Hatchery, Lancaster, Pa.*

Gericke's methods have had to devise a system for aerating the water by bubbling air through it—a device that Gericke considers not only useless but possibly harmful. Another criticism is that the system of covering the basin with the seedbed frame makes it difficult to test and control the chemical composition of the liquid. For the average operator, they claim, gravel culture is a simpler and more reliable procedure.

Gravel Culture

In Florida, where most of the commercial establishments are located, it is only natural that they would disregard the teachings of a Californian about litter types. Here all of the plants are grown in gravel-filled beds. A typical enterprise is the one owned by Charles Kehm near Miami. Each of his 17 tanks is 100 feet long, 3 feet wide, and 8 inches deep at the edge, tapering to a "V" shaped bottom which is 12 inches deep at the center point; the whole bed slopes gently toward one end. The beds are made of four-inch concrete walls which are coated with asphalt to prevent the cement reacting with the slightly acid chemicals in the water. For this same reason, soft limestone gravels cannot be used. Kehm imports his gravel from Alabama; in other parts of the world, volcanic cinders, slag from glass manufacturing, and other non-reacting materials have been used successfully. Half-tile cover the "V" of the bottom of the tank to keep the gravel from interfering with the filling and draining of the bed. Each bed connects with a flume which in turn is connected with a sump and a 17,000 gallon overhead storage tank. At each feeding around 8,000 gallons of liquid pours into the flume and through it into the beds to within an inch of the top of the gravel. As soon as the beds are filled the supply from the storage tank is shut off and the liquid is allowed to drain off into the sump from which it is pumped back into the tank. There are a number of variations of this arrangement—the Florida Christian College, at Temple Terrace which runs a hydroponic farm to help support the school, uses an underground storage tank and pumps from it into the beds; others allow the liquid to flow from one bed into another. All of them, however, are trying for one thing, to get the liquid into the bed and out again as rapidly as possible. The plants feed on the chemicals in the liquid around the gravel.

"The most important points in running a hydroponic plant," said Charles Kehm, "is to start out with a properly built place, to establish and maintain a constant formula, and to maintain the utmost cleanliness. The formula we use runs something like this: 75 to 120 parts per million of nitrogen—we use the high nitrogen formula for cucumbers, the low one for tomatoes—400 parts per million of potassium, 75 parts per million of phos-

phorus, 60 to 70 parts per million of magnesium: and 6 liters of sulphuric acid for every 10,000 gallons of water, in order to bring the pH to between 5.8 and 6. We don't add calcium because we get plenty in our water and in the triple-super phosphate; sulfur is supplied in the sulphuric acid and with the potassium which we get as a sulphate. To fill the needs for trace elements we add 2 parts per million of iron, one half part per million of manganese and also of boron, five one-hundredth's parts per million of zinc, two one-hundredth's parts per million of copper, and eight-tenths of a gram of molybdic acid to each 10,000 gallons of water.

"We test for nitrogen and phosphorus in the solution every other day and buck up the solution if it is off by as much as 10 per cent. We test for potassium, calcium and magnesium once a week. We don't try to test for the trace elements; we add 8 ounces of iron and one of manganese to every 10,000 gallons of solution twice a week, and add 6 grams of zink, 3 grams of copper, and 8/10 gram of molybdic acid every two weeks."

"There is no way to keep the chemical salts from building up on you," Kehm continued. "What happens is that, after a while, the plants take the nutrients and leave a chemical residue that they can't use. If you let it go too long, it would hurt the plants, so about every ten weeks you have to dump the whole batch and start over again fresh. At that time you usually run some water through your tanks to leach out any build-up of salt there."

With roughly $1,000 a bed invested in such an enterprise only high priced crops can be grown economically by hydroponics—though practically every crop from wheat to trees will grow in water. Kehm's main crop has been tomatoes at the rate of two crops a year plus a crop of seedling pepper plants which he raises for transplanting. He hopes to change to flower-growing in the future.

His tomatoes are planted in a hydroponic seedbed made of a substance called vermiculite, which is exploded mica. The seeds are broadcast on the bed around five weeks before they are transplanted to the growing beds.

"We starve them for two or three days after transplanting," Kehm said, "in order to force the roots to develop. By starving I mean we run water through the gravel instead of feeding them. Their roots will grow a lot more root-hairs this way. Incidentally this shows you what you can do with feeding. In ground culture you plant your crop and hope that it does well. If your plants are growing soft and stringy from too much nitrogen, there isn't much you can do about it. When that happens to us we just dump 10 or 16 pounds of potassium in the solution to harden them. Once the radio an-

$ $ $ MAKE MORE MONEY WITH $ $ $

$HORTHORN$ OR POLLED $HORTHORN$

(NATURALLY HORNLESS)

For Breeding • For Feeding
For Crossbreeding!

America's oldest and most profitable breed of cattle offer greater size, fastest gains, quiet, easy-handling dispositions and widest adaptability. Check modern Shorthorn and Polled Shorthorn performance records including carlot and single steer Grand Championships OVER ALL BREEDS.

Get the facts about Shorthorns, Polled Shorthorns, or both. Write us for illustrated literature and lists of member-breeders who can supply you with seed stock at reasonable costs.

AMERICAN SHORTHORN BREEDERS' ASSOCIATION
DEPT. FQ, STOCK YARDS, CHICAGO 9, ILLINOIS

The breed that is "BEST IN EVERY WEIGH"

MAXIMUM PRODUCTION!
WINTER PROTECTION!

ES-MIN-EL
ESsential MINeral ELements
TC
SPRAY OR DUST

You can now secure ES-MIN-EL in spray or dust form for direct application to the plant. If you haven't mineralized your soil . . . apply ES-MIN-EL in spray or dust form now. Feed your plants these minerals through the stems and leaves. ES-MIN-EL spray or dust is a neutral form of Copper, Manganese and Zinc.

ES-MIN-EL
ESsential MINeral ELements

SOIL APPLICATION

DEMAND

that your local fertilizer dealer furnish you a mineralized fertilizer containing the essential mineral elements.

For a greater production of vitamin rich fall and winter crops and protection for your dormant crops through the long cold winter months you should mineralize your soil now with ES-MIN-EL. Soil poor in minerals cannot produce maximum crops rich in vitamins. The health of your soil is just as dependent on minerals as is the human body. ES-MIN-EL contains the essential mineral elements of Copper, Boron, Manganese, Iron, Zinc and Magnesium. These mineral elements are essential to healthy, maximum production from your soil.

Apply an application of ES-MIN-EL to your dormant crops to protect and keep them healthy through the dormant period. This application of minerals will return your crops to an earlier, richer, healthier production in the Spring.

Send a card or letter for free booklet on ES-MIN-EL to Tennessee Corporation, Grant Building, Atlanta, Georgia or Lockland, Ohio.

TENNESSEE TC CORPORATION
Atlanta, Georgia — Lockland, Ohio

SAVE UP TO 50%

ON FERTILIZING & SEEDING with EZEE FLOW

Registered Trademark

See Why More Farmers Choose

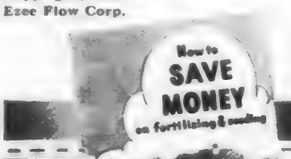
EZEE FLOW

Than Any Other Spreader!

- **GUARANTEED** to spread any fertilizer in any condition (hard, lumpy, wet—even wet lime) uniformly and without clogging!
- **GUARANTEED** "exact rate" spreading. You "get what you set" from 10 to 4,000 lbs. per acre. Prevents waste . . . saves money!
- **GUARANTEED** "exact rate" sowing of grain, most legumes and grasses (even brome) . . . prevents waste, helps assure even stand!
- **GUARANTEED**—dozens of *patented* "can't-be-copied" features!
- **GUARANTEED** to out-perform and out-last any other spreader on the market!
- **EZEE FLOW**, "World's Best" Spreader, challenges "all comers" to any test of uniform, accurate spreading! EZEE does it—best! For full information on Ezee Flow, and what it can do for you, see your Ezee Flow Dealer and MAIL COUPON, TODAY!!!

Copyright, 1950, Ezee Flow Corp.

(5, 6, 8, 10 and 12 ft. models and special equipment for every size and type of farm)



Free Picture-Packed Booklet

Clip and Mail Now!

EZEE FLOW CORPORATION Dept. FQ-9
10 S. LaSalle St., Chicago 3, Ill.

Without cost or obligation, send EZEE FLOW picture booklet showing how to save up to 50% on fertilizing and seeding costs. It's packed with fertilizer data!

NAME_____

ADDRESS_____

TOWN_____ STATE_____

nounced that we were in for a strong blow. I started feeding amonium sulphate right off and by evening the plants were limber enough to be laid down and covered with gravel. After the storm went over, I uncovered them and put them back on regular feed and didn't lose a plant."

Kehm plants his crop to be harvested in December, January, and February, and his second crop to be harvested in the summer. He sells his tomatoes on the Florida market at from $7 to $10 a bushel. He figures it costs him around $7 a bushel to produce 300 bushels from his 17 beds. This is a low yield, however; his record was 460 bushels.

The crop is sprayed every four days with an insecticide and fungicide as a measure of protection. In this type of operation, a disease that can be carried in the water is disastrous, for once it hits, it is pumped through the whole system within a few hours. "I imported a few experimental plants last year," Kehm says, "and with them I brought in nematodes—the little worms that cause root knot. I lost two crops of tomatoes before I got them cleared out of my beds."

The Hobbyists

The risk involved in commercial hydroponics is such that some people have wondered why the Kefauver committee didn't take a peek at it while they were investigating other gambling enterprises. Hydroponics can be practiced, however, without any large investment. Amateurs who have taken it up have produced respectable crops from tanks ranging from gallon jars or the two halves of a hot-water boiler cut lengthwise, to small concrete replicas of Kehm's tanks. These tanks have been rigged to work as gravel beds or as liquid reservoirs in the Gericke system. One whole system of hydroponics has been worked out for the small grower by Professor E. A. Spessard, of Hendrix College, which combines some of the features of both gravel and liquid methods. He recommends using sand in the growing beds instead of gravel, which permits him to feed the growing plants by irrigating the sand with small amounts of the solution which is used but once. He feels that in this way he has overcome the need for constant testing (always a problem for the amateur) since the solution is only used once and the nutrients and acidity will remain constant.

Formulae can be as exact as those worked out by scientists for their laboratory work or as simple as that presented by Dr. V. A. Tiedjens, Director of the Virginia Truck Experiment station who says, "For a start, you can use the following mixture: To one gallon of tap water add one teaspoon level full of baking powder (be sure it has calcium phosphate in it), and one of Epsom salts, one tablespoon level full of saltpeter, and a half teaspoon of household ammonia."

Backsliding

In Ohio, where a number of greenhouses have used hydroponics in producing flowers, a puzzling problem has developed. When the hydroponic beds were installed the plants in them outproduced the plants being grown in soil by a wide margin. During the last year or two, however, the plants in the hydroponic beds have not kept up their production. Professor Alex Laurie, of Ohio State University, who was one of the pioneers in the commercial field, is frankly confused about the reason for this slump. Various theories have been advanced to explain this situation—that there is a build-up of salts in the pores of the gravel material that is proving toxic, that a physiological reaction is taking place in the plants—but these are still just theories. "I am not recommending hydroponics on a commercial scale," Professor Laurie says. "I feel that we have learned a great deal about the soil and soil nutrients from commercial hydroponics just as we have from water culture in the laboratory, but now I feel that we have passed the point where it is useful to us."

An example of outgrowing hydroponics can be seen in the rose-growing greenhouses of Fred J. Murphy, whose two sons were students under Professor Laurie. Here ten huge hydroponic beds three feet wide by 250 feet long constitute about one third of the growing area. When the beds were installed 12 years ago, the roses grown in them produced 30 flowers to the bush as compared to 18 to 20 on bushes grown on soil. Since then a curious thing has happened. "Our hydroponic beds are still producing as much as they ever did," young Richard Murphy explains, "but we have learned how to make our soil beds produce just as much. Probably the most important thing we have learned is about aeration. Pumping the solution in and out is like a big bellows working three times a day. We realized that more air was an advantage that could be passed on to our soil beds. By using corncob mulches, grasses, and by cultivating we are now getting more air into the soil than ever before.

"Even though we are able to produce roses cheaper in our hydroponic beds, because of lower labor costs," Murphy concludes, "I am not at all sure that we would put in any more of them. We haven't suffered like some of the others, but that is the sort of unexplainable thing that can happen to you. You make a small mistake in gravel culture and you may not be able to tell what it is, but you feel it right away. In our other beds the soil acts as a great buffer with a wide latitude for cushioning human errors."

THE AUTHOR—Peter Fabrizius is the pen name chosen by a team of authors, Joseph B. Fabry and Maxwell E. Knight, who have been writing for popular and scientific magazines since 1933. They began their collaboration at the University of Vienna, where each received a PhD, and have continued it at the University of California where Fabry edits agricultural publications and Knight is editor at the University Press.

FAST WORKIN' WORMER

(costs 1¢ or less per bird)

DR. HESS NICOZINE begins taking effect *right now*. Large roundworms and cecal worms are expelled in 36 to 72 hours, without harming the bird. An economical treatment—it costs but ½c to 1c per bird per treatment.

Nicozine contains nicotine and phenothiazine. In critical tests, these ingredients killed approximately 99% of both types of worms and kept worm infestation at a low level.

Nicozine is easy to use . . . in powder form for flock treatment or in tablets for individual dosing.

Nicozine won't cause a laying slump and is equally effective in worming both chickens and turkeys.

For free bulletin, "Poultry Worms and Their Control," see your Dr. Hess dealer or write Dr. Hess, Ashland, Ohio

SIX KILLS LICE

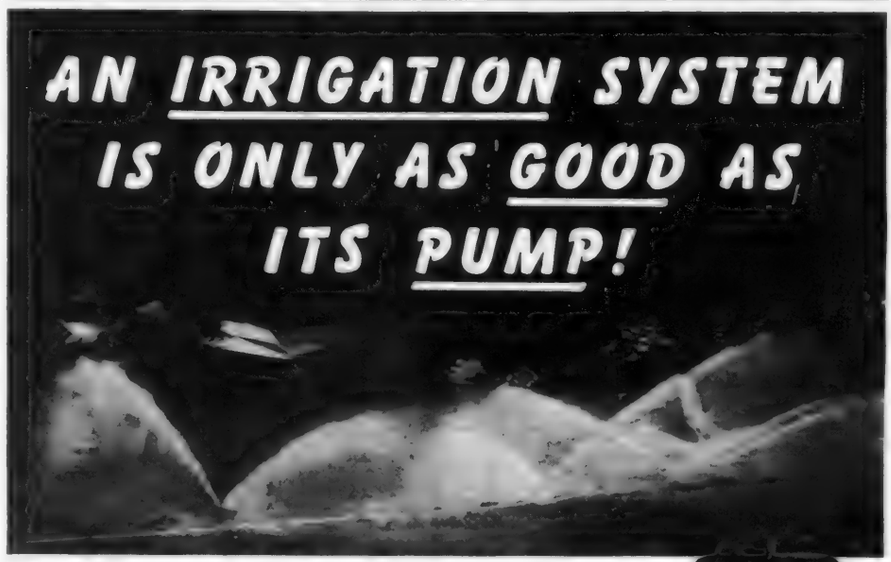
Dr. Hess SIX, a benzene hexachloride product, is six ways better for delousing:

1. Single roost application does a thorough job.
2. Long-lasting killing power.
3. Works fast, with less irritation to birds.
4. Inexpensive—about ¼c per bird.
5. Works in any kind of weather.
6. Easily applied on perches with handy spout can.

Dr. Hess NICOZINE

DR. HESS & CLARK, INC., ASHLAND, OHIO • SCIENTIFIC FARM-ACEUTICALS SINCE 1893

AN IRRIGATION SYSTEM IS ONLY AS GOOD AS ITS PUMP!

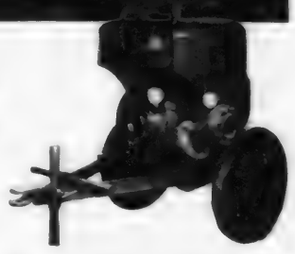


MARLOW "WATER WIZARD" Sprinkler Irrigation PUMPS

When you're picking the heart of your irrigation system, remember Marlow pumps can't be beat for features, efficiency or long life.

Marlows mean dependable irrigation — and Marlows have many extra year-round uses on the farm, too. Gasoline and Diesel engine, electric motor and belt-driven models.

For help with your irrigation problem, write to Engineering Dept., Marlow Pumps, 249 Greenwood Ave., Ridgewood, N. J.



MARLOW PUMPS 249 GREENWOOD AVENUE RIDGEWOOD, NEW JERSEY

Leading Manufacturer of Sprinkler Irrigation Pumps

WATER

WHERE NEEDED...WHEN NEEDED!

Moulton

PORTABLE IRRIGATION SYSTEMS PROVIDE *Controlled Moisture!*

- INSURANCE AGAINST DROUGHT
- IMPROVES CROP QUALITY AND QUANTITY
- EACH INSTALLATION ENGINEERED TO FIT YOUR FARM'S REQUIREMENTS
- ADAPTS TO UNEVEN GROUND
- SYSTEMS DESIGNED FOR EXPANSION

LIGHT WEIGHT, EASY TO MOVE ALUMINUM PIPE WITH MOULTON FLEXIBLE QUICK COUPLER

Completely Welded Unit

Satisfied users report doubling and tripling yields with Moulton sprinkler irrigation systems, soon paying for themselves! Proved and backed by over 12 years' irrigation "know-how." Plan now for next season.

Write Today For Full Information!

MOULTON IRRIGATION COMPANY

Post Office Box B — Withrow, Minnesota

If you call a veterinarian for a cow today you can be fairly sure of one thing. If the cow has a chance of recovering, he'll check her over carefully and do several things before deciding that she has milk fever. One of the most important is the so-called Sulkowitch test, which is made by mixing a sample of urine with an equal amount of a special reagent. A normal calcium level is shown by a cloudy reaction, while a deficiency is indicated if the urine remains unchanged.

The veterinarian may not be satisfied even if the test indicates milk fever. This isn't too surprising, for we know it may go along with other troubles like pneumonia, mastitis, metritis, acetonemia, and indigestion. If the test is negative, he still has to consider these as possibilities. In addition, he can think of things like broken bones, injured nerves, circling disease, rabies, transport tetany, and maybe a few others which are capable of putting a cow down in a paralyzed condition. Sometimes the symptoms of milk fever will be pretty well hidden by those of an entirely different trouble.

An example is a cow that had everted her uterus or "cast the withers" after calving. After replacing the organ, a routine check revealed that the cow also had milk fever. This happens pretty often, and there's a good reason why the two troubles have a tendency to go together. Since milk fever causes eventual paralysis of all body muscles, those surrounding the uterus may become incapable of holding it in place. In combination with the down position, such weakness allows the uterus to literally fall out of the cow's body.

When diagnosed and treated early enough, few cows die of milk fever any more. However, it certainly doesn't pay to treat animals by guess and by golly when the ailment is unknown. In this connection I always think of a cow that the owner had drenched with linseed oil because she was "bound up." It turned out that she was constipated because of milk fever. This was too bad, since her throat muscles were paralyzed so that she couldn't swallow. As a result the oil went into her lungs instead of her stomach, and the cow eventually died of gangrenous pneumonia.

Not so long ago there was no treatment for milk fever and most cows with the disease died. Then it was discovered that pumping up the udder with air was an effective treatment. This probably relieves the cow in one or both of two ways: (1) It increases the udder pressure and stops milk secretion and the draining of calcium from the blood. (2) It increases the udder pressure and causes calcium stored in the udder cells to be forced back into the blood.

The big disadvantage of this treatment is that it often leads to udder infection, and cows might be cured of milk fever only to come down with mastitis. Still, a

RILCO

GLUED-LAMINATED

RAFTERS

Better 3 ways

1. **KILN-DRIED DOUGLAS FIR.** Rilco Rafters are glued laminated framing members factory-fabricated of finish-grade, kiln-dried Douglas Fir. They are 4 times stronger than nailed rafters, give maximum resistance to wind and snow loads. There is a correct size for every width and type of building.

2. **WATERPROOF RESORCINOL GLUE.** This glue is not just water resistant but completely waterproof. Stands up permanently under extreme conditions of exposure or moisture. This is particularly important in dairy barns because of their high humidity. Quality bonding assures long-term service.

3. **ENGINEERED CONNECTORS.** Three special methods of joining add strength to every Rilco building. Angle irons anchor base of rafter to sill or foundation. Floor joists are connected to rafters with metal connectors to resist horizontal force. Ridge plates connect rafters at roof ridge. This makes a continuous framing member from foundation or plate to roof ridge.

RILCO

Only genuine Rilco Rafters bear this trademark...your assurance of a dependably engineered product

NO CUTTING! NO FITTING! Rilco Rafters are delivered cut to exact lengths, drilled for hardware, ready for rapid erection.

GOOD LOOKING! EASY TO WORK IN! Interior is 100% usable. No braces. Use any type of roof covering.

RILCO *Laminated* PRODUCTS, INC.

2508 FIRST NATIONAL BANK BUILDING

ST. PAUL, MINNESOTA

● Please send me information about Rilco

☐ BARNS ☐ MACHINE SHEDS

Name_____

Address_____

City_____ County_____ State_____

cow sick with mastitis is better than one dead with milk fever.

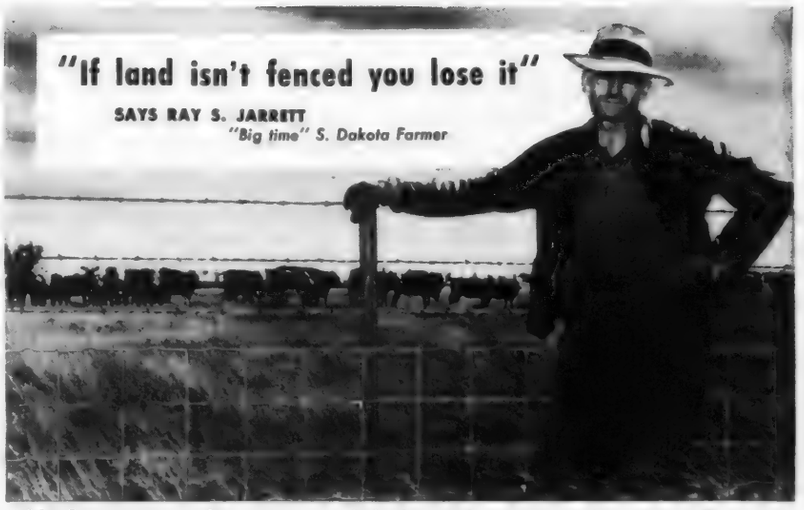
Then it was discovered that calcium gluconate solutions given through the jugular vein were effective and did away with the chances of udder infection. In addition, the solutions were more convenient to use. As a result, they represent the treatment most commonly used today. The usual dose consists of two pints of a sterile 20% solution, one being given through the jugular vein and the other being injected under the skin. That in the blood stream becomes available at once, while that under the skin is absorbed more slowly to offer help over a longer period.

Although highly effective, calcium gluconate can be dangerous when given directly into the blood stream. Being a heart stimulant, calcium that is given too fast may cause a cow to drop dead. For that reason fifteen minutes to half an hour may be needed for properly making an intravenous injection of the drug. In case of slow recovery or a relapse, the regular dose may be repeated in three or four hours. In such a case, further testing of the urine is desirable to be sure that a dangerous level of calcium has not been built up in the body.

Some cases do not respond to treatment as expected. Occasional cows aren't cured by calcium gluconate, but will respond to pumping up the udder with air. The reverse is also true at times, with calcium treatment being effective after udder inflation has failed. Finally, there's the problem class of cows that are slow to recover even when both treatments are used. Some of these animals just can't get enough strength to stand up again, while others are up and down at varying intervals between shots.

Some veterinarians have their own pet cures in case both the old stand-bys fail. However, only calcium injections or udder inflation has ever been known to correct a shortage of calcium in the blood. Consequently, if milk fever is really caused by a calcium deficiency, it is unlikely that other remedies will do any good. If some other treatment works, the results must be taken as proof that milk fever wasn't the primary trouble in the first place. On the other hand, if your cow doesn't respond to repeated treatments, don't be too quick about condemning your veterinarian as a dimwit who doesn't know enough to make a correct diagnosis and give the right remedies. Some cows have the knack of making good veterinarians look silly, no matter what is used on them to correct milk fever. Maybe yours is one of that kind. All affected cows don't get up and walk away after a shot in the neck, and that's for sure. We only wish they did.

If you have to call a veterinarian on a milk fever case, you can do a few things for the cow while he is coming. If she is down you can keep her propped up on her belly in something like a normal posi-



Mr. Jarrett owns and manages one of the largest farming operations around Britton, South Dakota. He ships some 50 cars of cattle a year from his own loading chute and raises about 500 hogs and 5000 sheep. He has about 3000 acres in corn, 3000 in oats, 1000 in millet, 3000 in native grass pasture and considerable flax, wheat, barley and alfalfa.

Mr. Jarrett knows the value of woven wire fence as a farm tool. He has about 200 miles of fence on his land—and a large share of it is U·S·S American.

"Fencing is a big operation on my farm," he says. "I buy about 1000 to 2000 rods of woven wire at a time and it's got to do the job. American Fence stands up well in this country. It has given me real service."

This huge operation shows what a time and work saver good fence can be, for only 20 men are on the payroll. Two of them take care of building and maintaining the fences which are put up largely with American Steel Posts.

No matter how big your farm may be, American Fence can help you plan efficient operations to make the best use of your land.

6 favorite features of American Fence

1. Long Life Wires
2. Hinged Joint
3. Tension Curve
4. Full Gauge Wires
5. Correct Spacing of Wires
6. Full Length and Height

WRITE FOR NEW FREE BOOKLET

American Steel & Wire Company
844 Rockefeller Building
Cleveland 13, Ohio

Please send me your booklet, "Fencing—A Production Tool to increase farm profits."

Name .....

Address .....

City ..... State .....

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO · COLUMBIA STEEL COMPANY, SAN FRANCISCO, CALIF.
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, ALA. · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN FENCE

There's more American Fence in use than any other brand!

UNITED STATES STEEL

Peirson-Moore Driers carry the famous Underwriters' Label of Approval . . . your guarantee that our driers are soundly constructed and safe from fire hazards. **Write today for complete literature on crop drying.**

MORE PROFIT FROM CORN AND SMALL GRAINS

Harvest Independent of Weather! Dry Out and Store Without Loss! Preserve Food Value!

Corn and small grains are handled efficiently and with large savings when an All-Purpose Drier is used on the farm. **Yields per acre are higher,** since field losses are negligible. New, late maturing hybrids with **greater production** can be used successfully. Fields are clear early for safe planting of cover crops. Many users of our equipment say it **pays for itself in one season.** Our driers are easy and economical to operate. Large and small sizes. Present farm buildings can be inexpensively adapted for drying of corn, small grain, hay and other crops.

Write for FREE color booklet.

PEIRSON-MOORE CO.

740 National Avenue Lexington, Kentucky

WISE FARMERS

get More Profits

FROM THEIR FARMS

See these books on approval and get Top Profits from Your Farm

Dairy Cattle and Milk Production

By C. H. Eckles and E. L. Anthony

A thorough treatment of every phase of dairy cattle management—selecting, breeding, raising, handling, feeding, milking, and factors influencing the composition of milk and control of disease. New statistics and new information on the industry are included in this latest edition. *4th edn. il. $5.00.*

PRINCIPLES OF Field Crop Production

By J. H. Martin and W. H. Leonard

1176 fact-packed pages on the most up-to-date, best methods of planting, cultivating, and marketing all crops in all parts of the United States. Complete information on seeds, tillage, crop improvement methods, fertilizers, and all other factors in profitable crop production and marketing. *$6.00.*

Farm Management

By Black, Clawson, Sayre and Wilcox

Providing a highly practical study of the economic and technical problems of farm management, this book covers all questions of management which face the modern farmer. It is broad enough to cover farming in all of the U. S. and gives concrete examples of all the main types of farming. *1947—$6.00.*

Modern Breeds of Livestock

By H. M. Briggs

An invaluable guide for any farmer seeking to increase the productivity of his livestock, as well as for breeders. Breed standards, blood lines, productions records, established herds, breed associations and all other useful information on over 60 breeds of milk and beef cattle, hogs, sheep, goats, horses, ponies, and American Jack. *$5.50.*

SEE THEM ON APPROVAL

The Macmillan Co., 60 Fifth Ave., N.Y. 11

Please send me the books checked. I will either remit in full or return the books in 10 days.

- ☐ Dairy cattle and Milk Production
- ☐ Prin. of Field Crop Production
- ☐ Farm Management
- ☐ Modern Breeds of Livestock

Signed .....

Address .....

.....

.....

tion. You can do this with bales of hay or sacks filled with something or other. If you let her lie stretched out she is likely to bloat or breathe part of the stomach contents down into her lungs to cause death from pneumonia. You can also hide your drenching bottle where you can't find it for a while. A cow with milk fever can't swallow. If you want to kill her, you'd better use a shotgun and get the job done mercifully and in a hurry.

Can You Prevent It?

Can milk fever be prevented? Veterinarians would like to know the answer to that one, too. Feeding calcium with the protein supplement has been suggested. This doesn't seem logical as cows with milk fever already have reserves of calcium in their bones, but can't use it.

Prevention of milk fever depends on recognizing the symptoms in advance and then beating the disease to the punch. There is no way of recognizing the symptoms of milk fever a month in advance of the day it first strikes, and there's no way of foretelling if a cow will come down with it. There is probably an exception in the cow that has had milk fever on calving. She may have it again. In that case, an injection of calcium gluconate before calving would be a preventive.

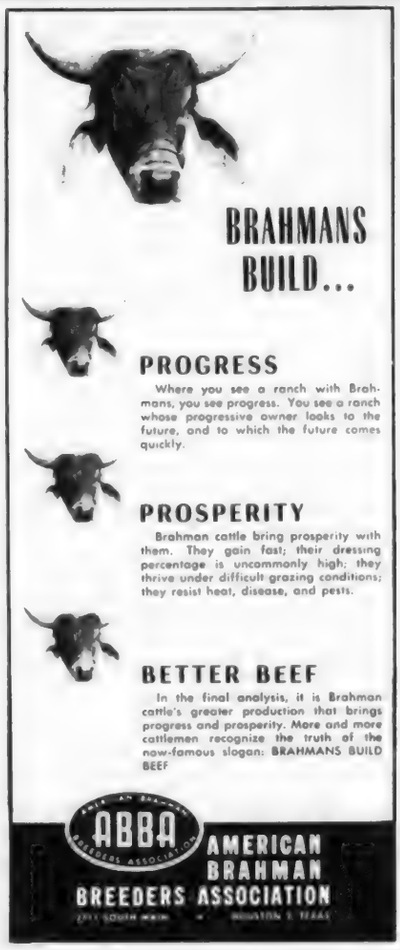
Otherwise, a preventive program is probably limited to incomplete milking during the first three or four days after calving. To make sure of this the cow and calf should be separated right after the youngster has had a good meal of the first milk. This is because it's hard to control the intake of a suckling calf, and it's easy for them to get too much milk from a cow that's susceptible to milk fever. Incomplete milking keeps the udder pressure high and has a tendency to prevent milk secretion and thus should act to retard drawing off calcium from the blood.

Certain college professors believe that incomplete milking has no effect whatever on the prevention of milk fever. Well, maybe they're right, but a lot of our milk fever cases occur where cows have been milked dry or stabled with calves after freshening and a lot of our relapsing cases involve cows that had been milked contrary to recommendations. As a result, it isn't wise to tell owners that they are running no risk in milking cows dry right after calving. If the incomplete milking doesn't do a cow any good, it at least won't do her any harm. That's more than can be said for milking a fresh cow dry, since the practice encourages her to heavy milk production while she still has to be considered as a sick cow. Why get in a hurry about it?

THE AUTHOR: Jack Bailey is one of our favorite reporters on veterinary subjects. *Farm Quarterly* has published a lengthy list of his articles on a variety of phases of animal health. Bailey practices veterinary medicine in dairy-famous Wisconsin, a logical situation since he was born on a Wisconsin dairy farm and has been interested in cows since he was old enough to walk to the barn to watch his father milk. Before he studied veterinary medicine he was a widely known herdsman, which helps to account for the sound, practical approach of his writing. He will publish a book on cattle diseases in the fall.

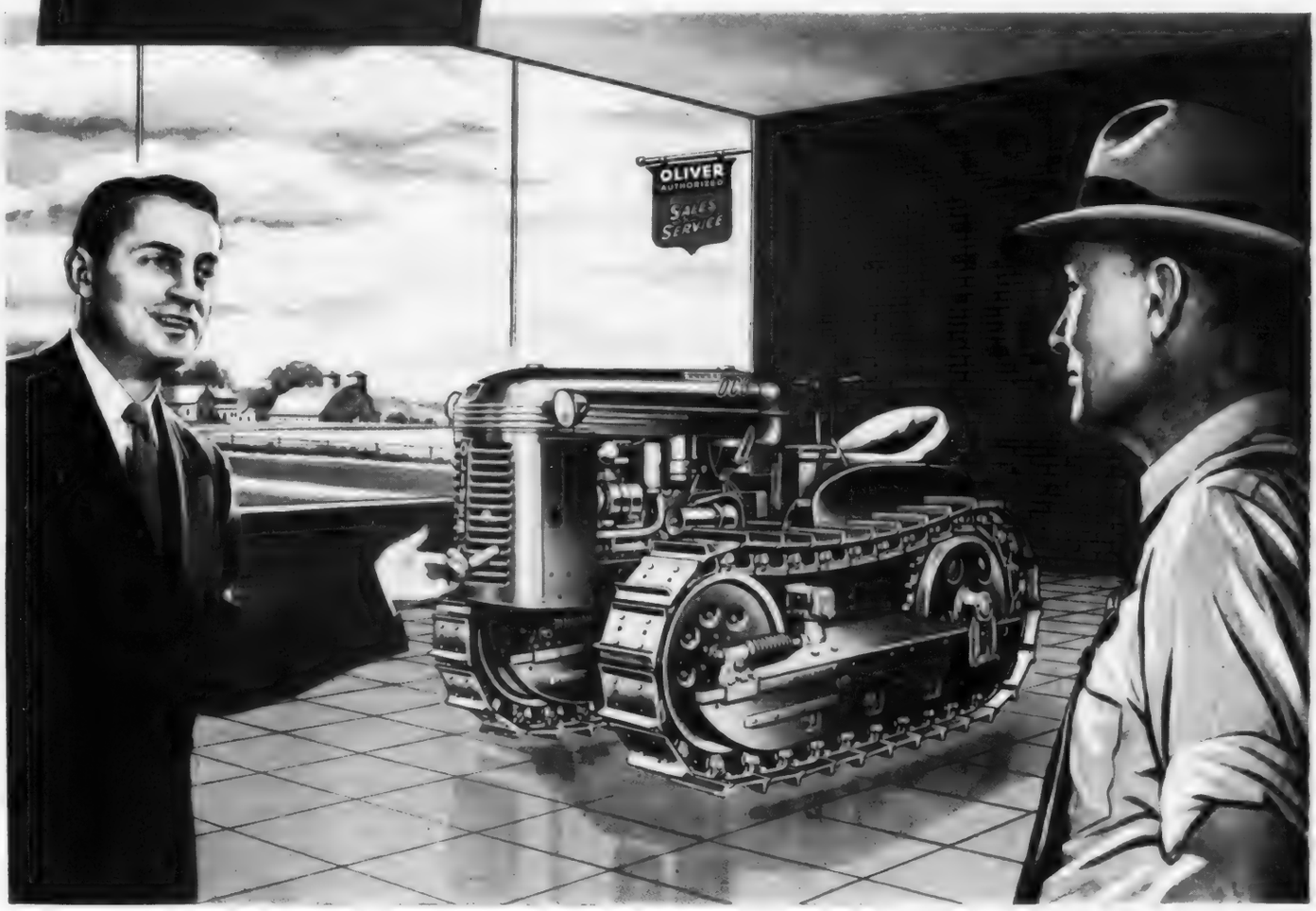
BUCKNER
the heart of your irrigation
Your sprinkling system is only as good as the sprinkler heads. For long-lifed, trouble-free operation specify BUCKNER SPRINKLERS
Write A. H. Clark FREE CATALOG
BUCKNER MANUFACTURING CO.
P. O. Box 232 • Fresno, California

Eastern Office 7658 Calumet Ave. Chicago, Ill.


BRAHMANS BUILD...
PROGRESS
Where you see a ranch with Brahmans, you see progress. You see a ranch whose progressive owner looks to the future, and to which the future comes quickly.
PROSPERITY
Brahman cattle bring prosperity with them. They gain fast; their dressing percentage is uncommonly high; they thrive under difficult grazing conditions; they resist heat, disease, and pests.
BETTER BEEF
In the final analysis, it is Brahman cattle's greater production that brings progress and prosperity. More and more cattlemen recognize the truth of the now-famous slogan: BRAHMANS BUILD BEEF
ABBA
AMERICAN BRAHMAN BREEDERS ASSOCIATION

Why it Pays to Visit Your OLIVER Dealer

You can prolong the life of your equipment as much as one-third, and more, with proper care and maintenance. That's why your local Oliver dealer offers the best machinery insurance you can buy—expert service that adds extra working years to your implements. Your Oliver dealer knows farming, too, and is extremely practical in his sales counsel. From the broad Oliver line he will help you select the implements and power that fit your particular conditions and practices best.



EXTRA PULL ... for the tough acres!

We've put *extra* pulling power into this versatile farm tractor—the husky, 2-plow Model "OC-3"—to help you get crops in, and off, your hard-to-farm acres faster and easier. For it's in the tough spots—in snow and mud, on sidehills, sand and muck—that the real efficiency and economy of an Oliver Model "OC-3" show up.

No need to wait for the weather. No need to stay out of soft fields at harvest time. Long, soil-gripping crawlers give you both "flotation" and positive traction—light-footedness on spongy lowland . . . sure-footedness and stability on the steep pitches.

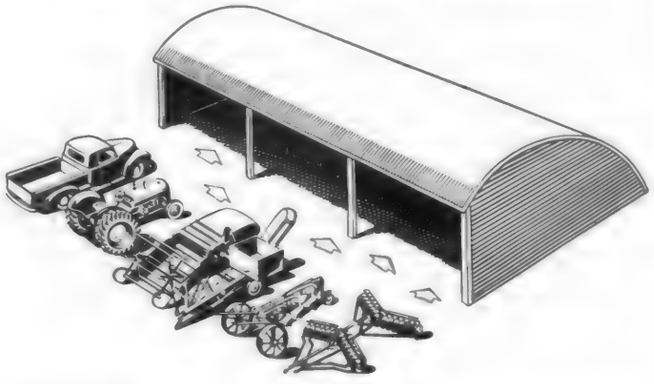
Here's an *all-purpose, all-weather* tractor specially built for farm duty, and available in tread widths of 31, 42, 60 or 68 inches to meet the exact needs of ordinary work, row crop care and tree culture. It's sturdy, low, compact and easy to handle. The OLIVER Corporation, 400 West Madison Street, Chicago 6, Illinois.

OLIVER

"FINEST IN FARM MACHINERY"

OLIVER AUTHORIZED SALES SERVICE

THE FARM BUILDING BUY OF THE YEAR!



STRAN-STEEL

QUONSET 24 SPECIAL

This great farm building can work for you in many ways. Use it as a loafing barn for cattle—for storage of all sorts—to protect valuable trucks or farm implements. It's a real production tool.

The Quonset 24 Special is available in any length you need, in sections of 12′. Its minimum size is big enough to shelter a truck, tractor, small combine, cultivator plow and disc harrow—all at one time. No interior pillars or posts to interfere. It can be erected on raised foundations to accommodate extra-tall machinery.

For an all-round utility building that gives you year-round service, plan on adding a Quonset 24 Special to your farm this year. Get the facts from your nearby Quonset dealer right away.

QUONSETS GIVE YOU EXTRA ADVANTAGES

Quonsets are made of N-A-X HIGH TENSILE steel, patented and produced by Great Lakes Steel Corporation. The use of this stronger, tougher steel permits simplified construction that saves you money, yet provides a structure of tremendous strength and durability. Quonsets are wind-resistant, non-combustible, rotproof . . . completely permanent.

YOU NAIL TO STRAN-STEEL FRAMING

STRAN-STEEL AND QUONSET REG. U.S. PAT. OFF.

QUONSET 24 SPECIAL

- Perfect Shelter for Equipment or Livestock
- Easy to Buy, Erect and Maintain

GREAT LAKES STEEL CORPORATION

Stran-Steel Division • Ecorse, Detroit 29, Michigan

PRODUCER OF N-A-X HIGH TENSILE STEEL

NATIONAL STEEL CORPORATION

Use this coupon for information about Quonsets as a production farm tool. We will include the name of your nearest Quonset dealer, from whom you can get the detailed costs.

NAME_____

ADDRESS_____

CITY_____

STATE_____

28

GREEN GRASS OF GREENBRIAR

(Continued from page 53)

of the silage. A little of it mixes with the first silage but the cows never complained so I guess it isn't harmful. If we were afraid of them mixing we could lay down a layer of fertilizer bags before adding the saw-dust, but it's not necessary."

Two of Skaggs' silos stand beside his milk barn. He can haul silage by the wheelbarrow load along a ramp to feed bunkers outside the barn in the concrete floored feeding lot where his milk cows spend mild winter days. He has a big loafing shed inside. The milking parlor is a new eight stanchion parlor where milk is piped through transparent plastic tubes from the cow to the can in the other room. Last year his cows averaged 8,000 pounds of milk and 353 pounds of butterfat, a figure which Skaggs thinks can be brought up to 400 pounds.

During the depression of the thirties the Greenbrier Valley along with the rest of the country was having its troubles. Skaggs remembers those years as difficult ones when you did well to get along. He knew the value of grass but didn't know that it was possible to make it produce so much forage. Then there was little money for fertilizer, lime and seed, and if he did produce meat and milk the price was low and the profit small. In more recent years when extension people and soil conservation specialists started talking about the virtues of good grass crops in the Greenbrier Valley the idea made sense to Skaggs.

"I'm not so much afraid of a depression any more," he says. "If there should be one I'm ready for it. My major expense is the grain I buy and if artificial drying of hay works out for me as I expect, I can cut down the cost of buying grain considerably because the hay quality will be that much better."

Taylor Campbell's Farm

The trend toward more grass is evident on such farms as the 582 acres owned by Taylor Campbell on the northern edge of Greenbrier county. Campbell took over his father's farm a few years ago and decided at the time that he would make a few changes. He had seen his father work his life out in the fields growing corn and wheat and regardless of what he did for the land the yields continued to slip until the farm was in pretty bad shape. Campbell, who often gets around over the valley, noticed that the only farms that weren't in the same plight were those where grass had been replacing grain. He took this lesson home with him.

"I'm putting my fields down in pasture crops as fast as possible," he says. "As soon as I can get grass on all of them I'm going to throw my plow away. I already have it narrowed down to a few acres of corn. Until you get really high value grass you have to have some grain even for beef cattle. And even on a grass farm there is no objection to growing a little corn if you have a piece of land suited to corn. My objection is that it's too much work."

Campbell rejuvenates his pastures by disking until all the grass is uprooted and chopped, and planting seven pounds of orchard grass and a pound and a quarter of ladino clover. "I haven't found anything to beat ladino," he says. "My only objection to it is that when you cut it you have to get it off the field fast or the ladino will grow right up through it." He gets three cuttings of hay from this combination which averages four tons to the acre annually. One of his better fields will carry two cows and their calves through the summer. He can easily pasture two steers to the acre and feels that an acre will supply the year 'round forage, pasture, hay and silage, for one head of beef. "These new pastures will carry four times as many cattle as bluegrass and white clover alone," he says.

Last year Campbell paid $72 a head for 31 steers. Six months later he was offered $175 each for them and they had been fed no grain. "I decided to hang on to them for a while longer, though. They weren't finished out and I still had plenty of feed."

Although he is still in the early stages of switching to a complete grass plan, and is still adding numerous improvements to his farm, Campbell is already recognizing a profit. Last year, after all bills were paid and living expenses for his family were

accounted for, he found that he still had nearly $3000 net. This he considers a fair savings for the year and only a beginning.

Campbell, in addition to farming, operates a slaughter house with his brother. They travel over several counties of eastern West Virginia buying cattle to butcher. "We buy them from both inside and outside the Greenbrier Valley," he says, "so we know how the steers raised here stack up with outside animals. We would rather have Greenbrier steers finished on grass than steers from other sections finished on grain. They are firmer fleshed, dress out in higher proportion, and are generally marketed heavier."

Farmers who have cut out the corn field labor often dislike to tie themselves down to daily milking chores when they can let beef cattle manage themselves much of the time. These, for instance, are the sentiments of Ross Tuckwiller who runs 230 head of herefords on his 958 acres north of Lewisburg.

The Tuckwiller farm has been in the family for four generations, and the house, a 125 year old colonial two story brick, has kept up with the times. One of the recent improvements in the house is a comfortable office where Tuckwiller spends rainy days at his paper work. And his paper work is considerable for he is president of the State Board of Education, The State Fair Association, West Virginia Livestock Marketing Association and the West Virginia Wool Growers Association.

Tuckwiller follows a cow and calf plan and usually sells the calves at eight or nine months. His yearling steers generally weigh around six hundred pounds.

"When I got out of agricultural college in 1916," he says, "I came back here with the ambition to raise 100 acres of corn. I got sick of growing corn and turned back to grass. I don't work as hard and I'm doing better than I ever did with corn. I wouldn't trade this mountain farm for one of equal size in the best corn growing land of Illinois. Even if I do have to go down in a hollow once in a while to find a cow or calf, I still like the hills."

The Tuckwiller farm has followed the familiar pattern of Greenbrier Valley farms. It became a good grass and stock farm after it was cleared of the virgin timber. And for decades it continued to produce high class stock because the grass continued to grow thick and nutritious. But those were the days before fertilizer came into the picture and farmers didn't know about liming and modern seeding mixtures so, as the fertility of their fields slipped, there wasn't much they could do about it. There followed a period when much of the land, then acid and infertile, reverted to broomsedge and running briars. "When I was a boy," Tuckwiller says, "they had to mow a path through the briars so we could walk to the schoolhouse across the field. I got rid of the poverty grass and briars with lime and fertilizer and manure."

You can Depend on DEMING
for ALL pumping equipment
For Irrigation Service, the Deming line includes horizontal and vertical centrifugal pumps, shallow and deep well turbine and jet pumps, power driven reciprocating, or plunger pumps. Virtually all types of Deming Irrigation Pumps may be operated by either electric motor, gasoline or Diesel engine, or by belt drive from tractors or other power units.
For Water System Service, the Deming line offers you an unmatched selection for type and capacity to meet your needs exactly.
Free catalog data on any type of pump or water system named in your inquiry will be mailed promptly.
THE DEMING COMPANY
510 BROADWAY • SALEM, OHIO

Get more Profit from your Farm

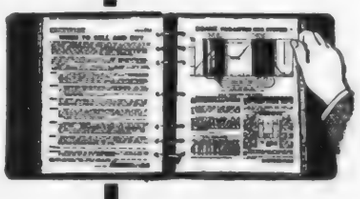
Would you like

—to know *when* to sell and buy?
—to sell at better than average prices?
—to know what prices are ahead on crops, livestock, hogs, etc.?
—to know whether it is more profitable to feed grain or sell it?
—to know which farm enterprises are most profitable?
—to have answers to the hundreds of questions facing you daily?

You can farm more profitably by knowing the answers, and by following closely the practical advice in the

DOANE AGRICULTURAL DIGEST

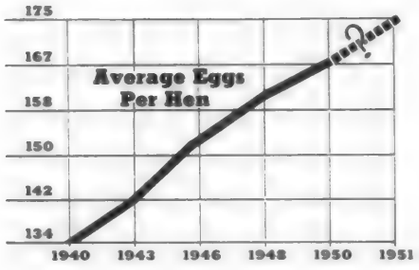
and its twice-monthly releases. Thousands do . . . Prepared by the oldest and largest farm management and agricultural research organization for the guidance of its own farm managers (operating *for profit* hundreds of farms, ranches and plantations), the results of this wide experience are contained in the Digest . . . This 450-page loose-leaf reference volume covers every phase of agriculture. It is kept up-to-date by twice-monthly releases, which interpret trends and predict outlook on prices, production, markets, shortages and surpluses ahead . . . Particularly important each month are releases on "When to Sell and Buy," "Important This Month" and "Business and Agriculture". . . Farmers, ranchers and business men in every State, in Canada and Mexico, use the Digest because *it pays.*



Write today for
FREE SAMPLE RELEASES
and learn how the Digest can help you get more profit from your farm.

DOANE AGRICULTURAL SERVICE, Inc.
Box 242 5142 Delmar Blvd.
St. Louis 8, Mo.

WILL YOUR EGG PRODUCTION Increase ...Keep Step with the National Increase?



AN INCREASE of 25% in the average egg production per hen in the U. S. from 1940 to 1950 is a tribute to steady improvements in breeding, in management, in feeding.

Plan to keep your egg production increasing at this same rate by feeding Tuxedo Eggmash to your pullets from the time you put them in the laying house.

Tuxedo Eggmash is always a leader in providing the latest proven advancements in poultry feeding for big egg production. Tuxedo research and testing never stand still. That is why most Tuxedo Eggmash users get egg production per hen which far surpasses national averages.

Start using Tuxedo Eggmash now. Keep a record of eggs produced and feed costs, and we know you, too, will agree it pays to feed Tuxedo.

The Early & Daniel Co.
Cincinnati 2, Ohio
Our 70th Year

THE FEEDERS' SILENT PARTNER

TUXEDO
Eggmash

Buy with confidence—Feed with pride

One of his 100 acre fields supported two horses and a cow 35 years ago, "and they were hungry a lot of the time." Today the same field feeds 57 cows and 118 sheep. He carries 28 steers on one 24 acre field and they can't keep it down. The same field carried 20 steers last year and produced 500 bales of hay.

It was 20 years ago that Tuckwiller began to revamp this field with an application of 500 pounds of 40 per cent superphosphate and two tons of lime to the acre. Three years later he added another 600 pounds of super-phosphate and the field had been manured twice in the meantime. It has needed no treatment for the past six years and Tuckwiller, who keeps a close eye on his grass crops, can't predict when it will need another treatment. He still has 100 acres of land suitable for corn so he has this land in a three year corn, wheat, meadow rotation. His corn yields 100 bushels to the acre.

He likes his cow and calf plan and doesn't plan to start buying steers to pasture. "But if I did," he says, "I'd buy common stuff because I think the profit would be higher. A man raising calves, however, would be a fool to raise anything but the best he could afford, since it costs as much to raise a scrub calf as it does a good one."

Although every year finds the Greenbrier Valley looking greener and more prosperous, it still has its poor farms, including some which will probably never be prosperous. Some of the area has a thin shale soil where timber and coal are still the major crops, and here scattered subsistence farmers just get along.

More and more Greenbrier farmers are going into dairying for this is good dairy country and the dairy farmer makes the biggest gross income. Of the 1800 Greenbrier County farms, averaging 145 acres each, 300 are now dairy farms. Sheep are growing in importance, a move that is sparked perhaps by the recent high wool and mutton prices and the fact that cattle and sheep run in the same fields makes for better utilization of grass crops.

If there is any single problem common to practically all farmers in this area it is the water shortage. They are solving this problem by building small ponds and concrete watering tanks. The Greenbrier Soil Conservation District spends much of its time helping farmers solve this ticklish water problem. The District, including three Greenbrier Valley counties supervised by District Conservationist Linwood Young, owns a dragline and bull dozer for making ponds, and a set of steel forms for making concrete watering troughs which cost the farmer less than $25.

Perhaps for the outsider the most significant thing about the whole farming set-up in the Greenbrier Valley is the fact that two centuries of grass farming have made the area one of prosperous farmers who live well and are happy with their work and with grass.

BERKSHIRE SOWS wean more pigs

- Average Gilt Farrowed 9.48 pigs per litter
- Average Sow Farrowed 10.02 pigs per litter (the most profitable sized litters)
- WEANED 96% OF THEM!

Free BUYING SERVICE
Order bred sows, gilts or boars by mail. Expert fieldmen. Satisfaction guaranteed. Write for details.

Production registry figures over a 5-year period.

Write for complete information and FREE copy of Breed Magazine.

AMERICAN BERKSHIRE ASSOCIATION
Dept. 14, 601 W. Monroe Street
SPRINGFIELD, ILLINOIS

WHY
YOUR BEST BUY
Block from Times Square . . . Walking distance to everything worthwhile.

HOTEL
LINCOLN
44TH TO 45TH STS. AT 8TH AVE.

1400 Rooms, each with Tub and Shower, from $3.50
SPECIAL RATES FOR SERVICE MEN

BEST

SHROPSHIRE
BREEDING STOCK
RAMS . . . EWES

BE SMART . . . START THAT SHROP FLOCK NOW

•

IROQUOIS FARM
COOPERSTOWN, N. Y.

Orlyt GREENHOUSE
LESS THAN $475.00

Comes in sections for easy assembly with bolts and screws. Size 10 by 11 ft. shown ready to put on your foundation. Automatic ventilation and heat at reasonable prices. Other Orlyts with slanted or straight sides including lean-tos start at less than $225. State if wanted for home garden or farm. Send for Free, fascinating Booklet No. 23.

Hand Book—"Greenhouse Gardening for Everyone." 22 chapters—well illustrated—postpaid, $4.00.

LORD & BURNHAM
IRVINGTON N. Y. • DES PLAINES ILL.

didn't seem to damage the Hessian fly at all.

Two other methods of destroying the fly at the egg stage, grazing the crop and mowing it, were tried out. Of these two methods, a physician who took an interest in farming, Dr. Asa Fitch wrote in 1846. "It is plain that a close fed crop will furnish few leaves for the fly to place its eggs upon, and these leaves will be commonly consumed before the eggs are hatched . . . There can be little doubt that on smooth grounds the scythe may be so used as to take off almost every spear below where the larvae are lodged."

From the writings of Dr. Fitch comes another method of attacking the fly that was used a century ago. "To us it appears evident," Dr. Fitch wrote, "that if one or two acres across the middle of a large field be sowed with wheat about the middle of August, all the flies in the vicinity will be attracted to this point, and there retained; so that it will be perfectly safe to sow the remainder of the field by the middle of September. The decoy wheat could then be turned under and the eggs destroyed."

There were even one or two early writers who believed that the wheat crop was benefited by the fly, since, they felt, "the unaffected shoots were stimulated to a more rapid and robust growth in consequence of the pruning given by the fly"; others, noting that the wheat grown on the richest soils were least harmed by the fly felt the fly would benefit the farmers by forcing them to manure their lands more.

Though we have proved that you can't crush the fly and that grazing is no deterrent and that the fly can't be outwitted with a trap crop, we still follow their basic recommendations. They believed that the most effective ways to fight the problem were: (1) sow the wheat late, after the fly has laid its eggs; (2) plow under the wheat stubble immediately after harvest when possible, to bury the fly in the flax seed stage; (3) plant grain which is resistant to the fly.

Wheat grown on good soil seems to be less badly damaged than the grain grown on poor soil. Certainly one reason for this is that the grain growing on rich soil has greater vitality and is able to send up tillers after an attack.

Safe sowing dates range from September 12 in the north to October 27 in Georgia.

County agents and state entomologists make annual surveys to determine the size of the fly population. Samples of wheat are collected, the sheath is stripped away to reveal the flax seeds, and the number of larva and percentage of the plants infested are recorded. With this information some indication of the severity of the fall outbreak is known. If it looks as though it would be severe, heavy emphasis is given to publicizing the safe planting date. Whether the fly population is high or low, each year the fly-free dates are published and broadcast. Even so, there are enough farmers who ignore them to make it possible to estimate their loss to the fly, which runs from five to 21 bushels to the acre less than the yield harvested by those farmers who observed the fly-free date. "Probably the most important factor that causes farmers to observe the fly-free date," said one entomologist, "is the practice of following beans with wheat. This practice automatically forces the farmer to observe the fly-free date, because the beans come off so late."

Where wheat is not used as a nurse crop for a clover to follow, the farmers are urged to plow under the wheat stubble soon after harvest. By turning under the stubble, the larva going through the flax seed stage will be killed and the fall crop of the fly will be reduced. Where wheat is followed by clover in the rotation this practice cannot be followed. The farmers are also urged to destroy all volunteer wheat where practical. A farmer can religiously plow under all stubble, but if there is a good stand of volunteer wheat along a fence row the fly will lay its eggs in it and, come spring, a new crop will be ready to lay their eggs in the young wheat that was planted after the fly-free date in the fall. This same sequence of events shows why fly-fighting is a community project. If one farmer plants his crop early and gets a heavy infestation of fly, he not only suffers damage to his

Now...Safeguard your stored Corn

AGAINST COSTLY INSECT DAMAGE

Insects have big appetites! You've heard of farmers losing as much as a third of their stored corn in one season—suffering damages up to 45 cents per bushel in food value. In the past, a lot of that insect damage was inevitable—there just wasn't any practical way to control weevils and grain moths.

At last there's a practical, *economical* answer to the problem—new PYRENONE* Grain Protectant. Not a fumigant, it is a powder that can be mixed right in with your corn when you put it into storage—without health hazards to man or animals. You prevent the spread of insects from infested ears to clean, sound ears. You cut insect damage to a minimum. New Pyrenone Grain Protectant has been tested and proven on thousands of bushels of stored corn.

If your regular insecticide supplier has not yet stocked Pyrenone Grain Protectant, send us his name and address and we will write him.

VALUABLE FREE BOOKLET — Write today to U.S.Industrial Chemicals Co., Dept. GFQ, 60 East 42nd Street, New York 17, N. Y., for your free copy of a booklet giving all the details.

Pyrenone*

GRAIN PROTECTANT

U. S. Industrial Chemicals Co.

Division of National Distillers Products Corporation

*Reg. U.S. Pat. Off.

FARM MANAGEMENT SERVICE

Consultation
on Farm Problems and
Farm Investments
in Eastern Corn Belt
and Southern States

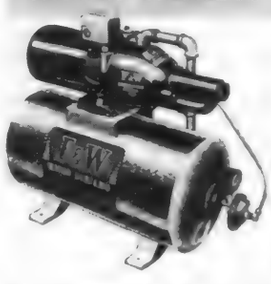
- More important than buying modern farm machinery! Opekasit scientific "know-how" and professional farm management helps farm owners realize maximum profits. Opekasit services include:
- COMPLETE MANAGEMENT SERVICE
- PLANNING • BUDGETING • SURVEYS
- ACCOUNTING • ENGINEERING
- FARM INVESTMENT ADVISORY AND APPRAISAL SERVICE

Georgia, Alabama, Ohio and Other States

WRITE FOR DETAILS

OPEKASIT
LEBANON, OHIO
OFFICES IN MANY CITIES

AVOID WORRY
ABOUT FALLING
WATER TABLE..



NEW
F&W
MULTI-
PURPOSE

If at any future time the water level drops in your location, you can change this pump from shallow to deep well operation *at no extra cost* by simply moving the jet off the pump and down into the well.

Whether you use this adaptable water system on deep or shallow wells—at high or regular pressures—you can be sure of quiet, dependable performance. Every Multi-Purpose is tested for pressure and capacity as are all F&W pumps.

In the complete line of F&W Centrifugal jet and piston models there's a water system to suit your needs. Send for helpful free book, "Running Water for Rural Homes." **FLINT & WALLING MFG. CO., INC., 947 Oak Street, Kendallville, Indiana.**

F&W
WATER SYSTEMS

own crop, but endangers his neighbor's wheat the next spring. The Hessian Fly is no respecter of line fences.

Fly Resistant Wheat

There were occasional discoveries of fly resistant wheats in the early days. A British schooner was captured in 1781 and its cargo of wheat delivered to Isaac Underhill, a Long Island miller and farmer whose entire crop had been destroyed by the fly. Underhill planted some of the captured wheat the following autumn and found that it was proof against the plague of flies that destroyed his neighbor's wheat. This wheat was successful in resisting the fly for several years until it lost its identity, through mixture with other seed, and its resistance to the fly through an increase in flies capable of attacking it.

In 1846, Dr. Fitch was able to list five varieties other than the original Underhill that were believed to be resistant to the fly. These varieties, Spelter, China, Mediterranean, Eturian, and White Flint were believed by some to be absolutely flyproof while others felt that they simply recovered better than other wheat after attack.

Today, entomologists and plant breeders test thousands of varieties of wheat to find the rare one resistant to the fly.

In one test of 3,000 varieties of wheat 92 were found to have some resistance to the fly and one was found that seems to be immune to it. This one, a durum wheat identified as PI 94587, originated in Portugal as did a very large number of the resistant wheats. PI 94587, however, had become a world traveler before it reached America. It was secured by the American plant breeder, Dr. R. M. Caldwell, from the collection of N. I. Vavilov, the great Russian geneticist; since then, Vavilov found that he could not see eye to eye with the party line theories of Lysenko and was removed as chief of the Bureau of Plant Industry for the nation and transferred from Leningrad to somewhere in Siberia, where he died under unpublicized and suspicious circumstances.

The Russian-Portuguese wheat was crossed with thousands of other varieties before Dr. Caldwell was successful in producing a virile offspring that had the resistance. The major difficulty in making the cross was that the durum wheat has 28 chromosomes while the soft red winter wheats with which he was breeding have 42. The good offspring has been back crossed many times to the red winter wheats to improve the yield and the resistance to other diseases such as leaf rust and the various families of smut. It will be several years before Dr. Caldwell and his associates are ready to release this wheat, but its history illustrates the painstaking care that goes into the breeding of any new variety.

It was by cross breeding the fly resistant Kawvale with the susceptible variety Tenmarq that the scientists were able to pro-

BOSTROM IMPROVED
FARM LEVEL

Accurate, Durable and Complete for Terracing, Ditching, Irrigating, Tile Draining, Grading, Running Lines, Turning Angles and etc.

The Bostrom is used and endorsed by Schools, Extension Service & Individual Landowners everywhere.

Anyone can operate a BOSTROM Level by following the simple direction booklet included with each Instrument. We manufacture 3 models; Farm Level, Contractors Level, Convertible Level. All BOSTROM Levels are sold on the guarantee of satisfaction or money back. WRITE TODAY for literature, prices and name of our distributor near you.

Bostrom-Brady Manufacturing Co.
534 Stonewall St., S.W. ATLANTA, GA.

COUGHS DUE TO COLDS

among horses, mules, cattle, sheep and dogs call for treatment with SPOHN'S COMPOUND. A stimulating expectorant. Acts on throat and bronchial tubes to hasten relief. Used by world-famous horsemen for 55 years. At drug stores, or direct, postage paid—75c and $1.50. **Spohn Medical Co., Box 14, Goshen, Ind.**

SPOHN'S COMPOUND
FOR COUGHS DUE TO COLDS

FOR FLOCKS
LARGE or SMALL

Cobb's truly great Sex-Link pullets from Mass., U. S. Approved — Pullorum Clean stock bring you surprising livability and production ability. Regardless of the size of your flock, you'll appreciate the extra profits these birds can give you.

CHICKS With the HIGH I. Q. (Inherited Quality)

Write for catalog and prices. ROBERT C. COBB, Breeder of New Hampshires and of Barred Rocks Since 1916.

COBB'S PEDIGREED CHICKS, Inc.
BOX 300 CONCORD, MASS.

Only $498

OTTAWA MULE TEAM TRACTORS

Over 4,000 In Use

Finest of all low cost tractors. Plows, discs, harrows, mows, saws, plants, hauls, etc. Has draw-bar pull for many jobs. Powerful, economical and super durable. Smartly engineered. Makes play out of hard irksome jobs. Excellent working visibility. Honor built. Designed for farmers, truck gardeners, private homes, estates, etc. Adjustable wheel widths. 16-inch row clearance. Has 3-speed Warner transmission, Rockford Clutch, 2 individual brakes, large roomy spring supported seat, Plow lift, auto type steering. Sold only direct to user at unusually low price. Prompt shipment. FREE details. In our 46th year.

OTTAWA MFG. CO., 1-189 Garden St., Ottawa, Kan.

KEEP POSTED
On New Crops
...New Methods

FREE 2 Year Subscription

Timely tips for profitable planting in every issue of CROP NEWS & VIEWS. Just drop a post card to

Scott FARM SEED CO., Locust St., Mechanicsburg, O.

For EXTRA QUALITY Sow Scotts Seeds

Culling all loafers
This is the time of year when many hens have quit laying and started to molt. These loafers won't lay again until late fall — but they eat almost as much as laying hens. It's time to cull them out so the rest of your flock can make a fair profit. Many Purina Dealers have Feeding Advisors trained to help you separate loafers from layers. Ask your Purina Dealer about his culling service.

How Purina Dealers' Feeding Advisors are trained to help you save the cost of feeding loafers!

CLASSES MEET ON POULTRY FARMS. Purina poultry specialists go with the feeding advisors right to poultry farms and *show* them how to pick out the loafers that have quit laying for the summer months.

POOR HEAD... POOR PRODUCTION. Purina Feeding Advisors learn to spot the non-producers by their pale, shrunken combs and wattles and yellow beaks. Here is one that should be culled to save feed.

WORKING END IS CHECKED. Feeding Advisors also learn how to identify culls by their dry, shriveled vents and their close-set pin bones. Such birds should be sent to market—*the sooner, the better.*

A SLOW MOLT is pointed out by the Purina Poultry Specialist to his class of Feeding Advisor students. Advisors are taught to cull slow molters from the flock because they stay out of production longest.

Culling service is just one of the many helpful services you can get from your Feeding Advisor. For sound feeding and management advice it always pays to see your

PURINA DEALER
in your community

Depend on the Checkerboard Bag for Quality...

...on the Checkerboard Store for Service

You Make More Money Milking With A

CHORE-BOY MILKING SYSTEM

CHORE-BOY TAKES THE WALK AND THE WORK OUT OF MILKING

Model "A" Milking System in Operation

- Cows Walk to Operator
- Less Work for Operator
- Weighs Each Cow's Milk
- Low-Cost Equipment
- Low Vacuum Helps Reduce Mastitis

Your dairy is on a sound money-making basis when Chore-Boy does the work. Whether you use or plan a loafing barn, the Chore-Boy Milking Parlor fits in perfectly. Chore-Boy saves you time, labor, and expense. It increases your milk production. Bacteria counts drop. Net result: More money for you!

Send for literature and

FREE PLANS

Let us help plan your pen barn

CHORE-BOY MILKING MACHINE CO.

819 East Kalamazoo Street • Dept. G • Lansing 11, Michigan

HOW TO SAVE $25 TO $50 PER COW

IN FEED COSTS ALONE!

Unbelievable? It's a proven fact, attested by official Dairy Herd Improvement records: Guernsey herds consume less hay and grain, yet continue to rank first in total production of quality milk.

Statewide summaries of Dairy Herd Improvement figures place the annual feed cost reduction per cow between $25 and $50. Multiply these savings by the number of cows in *your* herd. Imagine what you could do with a comparable sum of money. Add more Guernseys to your milking string and benefit by even greater production — make those wanted improvements around your farm — enjoy the countless advantages that so many Guernsey breeders and producers are enjoying today.

Shorter hours in the hayfield, lower feed bills all around, yet consistently high production of premium price GOLDEN GUERNSEY Milk.

Figure it out for yourself, in relation to your own operation.

$$$$$$$$$$$$$$

Send today for FREE Guernsey Booklet that shows how you, too, can save more — have more — with Guernsey Cows and Golden Guernsey Milk.

THE AMERICAN GUERNSEY CATTLE CLUB

156 Main Street
Peterborough, N. H.

Please send me the new Guernsey Booklet, "Own Guernseys in 1951".

NAME_____

ADDRESS_____

CITY_____ STATE_____

duce the fly resistant, high yielding wheat named Pawnee. This variety, which is now the leading wheat grown in eastern and central Kansas and in Nebraska and Oklahoma, has good resistance to the races of Hessian fly in those areas, is resistant to loose smut, stinking smut, and some of the races of leaf and stem rusts, and also produces grain of good milling quality.

In California the plant breeders have released Big Club 43 and Poso 42, two excellent varieties that have practically eliminated the Hessian fly problem in the Montezuma Hills wheat growing district. Resistant varieties suited to the eastern soft wheat region and new varieties for the Central States hard winter wheat area are now being tested and will soon be released to the farmers in these areas.

These wheats that are spoken of as having resistance to the fly in various parts of the country are resistant there because they are not seriously harmed by the race of fly that is present in the area. Resistant varieties may, however, be susceptible to races of flies found elsewhere. Pawnee and Poso 42 that do so well in Kansas and California, for example, are susceptible to the fly that is found in Indiana and Ohio. Often a variety that was thought to be resistant will appear to lose its resistance. Actually what has happened is that a race of fly capable of attacking it has gained in numbers. But while the fly that can attack a wheat variety is growing in numbers, the plant breeders are developing a new resistant wheat.

Barley growers still do not have a good resistant variety of barley to plant and must rely on planting after the fly-free date. Barley, in general, is much more resistant to the fly than is wheat and usually suffers little damage from the pest. Barley does, however, act as a host to the fly, a home away from home, when wheat is not available. At present, plant breeders are working on a fly resistant barley.

Like every other living thing, the Hessian fly has its troubles too. Ironically, the things that bother the Hessian fly are other insects. These tiny parasites, most of them minute wasps, lay their eggs in the larva of the Hessian fly and *their* larva use the Hessian fly larva for food. At present, some 20 of these parasites have been identified. The Department of Agriculture entomologists are always happy to import another Hessian fly parasite and to give those we have a helping hand.

The fight against the Hessian fly is a continuing thing; if we relax, our wheat growers face substantial loss. Since each female fly is capable of laying anywhere from 250 to 800 eggs, the fly population may jump from a few hundred flies to many millions in a single year.

CALF TO COW TO CALF

(Continued from page 69)

tem of feeding have size and scale by the time they are ready to be bred; and because they are large and well developed, they can be bred at an early age. There is a tendency today to breed heifers according to size, weight and condition regardless of age. The table below may be used as a guide in breeding heifers:

Breed	*Weight at Breeding*
Jerseys	550-600
Guernseys	600-650
Ayrshires	700-750
Holsteins, Brown Swiss, and Milking Shorthorns	800-900

The Expectant Mother

The average cow stays in the herd for five years. During the first two years of her life she is all outgo and no income. During the third and fourth year, she produces at a profit, but these two years of profit go to pay the cost of keep for four years. Usually she has one or more year at a profit and is then sold. With improved breeding, feeding and management, cows should stay in the herd until they are ten years old or older. A ten-year-old cow will have six profit years. Citing Mr. Bee again, he has a 16-year-old Jersey still producing at a profit. A cow like that becomes a member of the family. It's like raising a dutiful daughter who doesn't get married, but stays on to help her mother in the kitchen.

The care of the dry cow from which we get the heifer calf is one of the most important items in growing a cow that will produce at a ripe old age. The dry period should be called the preparation period, for it is during this time that so much can be done to make both the cow and the calf profitable. The preparation period is really the beginning of the next lactation, not the end of the one just finished. It should last from six to eight weeks during which time the cow must replace any flesh lost during the last milking period, develop two-thirds of the weight of the unborn calf, and store up reserves for the next milking period.

During the dry period the cow stores up body reserves which she draws on after freshening. The length of the dry period depends pretty much on the condition of the cow, but it should not be less than six weeks, and in low condition cows as much as eight to ten weeks. At this time the cow should be fat and happy, and she should occasionally put up her tail and gallop across the pasture.

How To Dry A Cow Up

Most farmers are shy of drying off a cow which is still giving a profitable quantity of milk, but they should be firm and think of the future of the animal. There are several ways to dry off a cow. Six weeks to a month before freshening date, even though she may be giving as much as twenty pounds of milk a day

Be your own Weatherman

with RAIN BIRD SPRINKLERS

Plenty of water WHERE you need it, WHEN you need it!

Save water, save labor, save crops with Rain Bird Sprinklers, famous around the world for their faultless operation, even distribution of water. You'll find increased production at lower cost when you irrigate with Rain Bird.

There's a Rain Bird Sprinkler to fit every irrigation problem—19 models in all, ranging in size from 1½ G.P.M. at 3 pounds pressure to 610 G.P.M. at 120 pounds pressure.

If yours is a special irrigation problem, consult our research department now. There's no obligation, of course.

NATIONAL RAIN BIRD SALES & ENGINEERING CORP.
AZUSA, CALIFORNIA
L. R. Nelson Mfg. Co., Inc., Peoria, Ill. • RAIN BIRD Sprinkler Mfg. Co. (Canada) Ltd., Vancouver, B.C.

"the COMPLETE GARDENER"

Bready

GARDEN TRACTOR

- PLOWS
- DISCS
- HARROWS
- SEEDS
- CULTIVATES
- ROLLS LAWN
- MOWS LAWN
- CUTS WEEDS
- PLOWS SNOW
- POWER TAKE-OFF

You just guide this easy-handling tractor through the toughest jobs. There are many profitable uses for a Bready on your farm—all year 'round.

Rugged, dependable, economical to run. Choice of five tractor models and 17 all-purpose implements. See Bready at your dealer's now.

WRITE TODAY *for free folder and name of nearest dealer.*

THE BREADY TRACTOR & IMPLEMENT CO.
BOX 202 • SOLON, OHIO

THE FENCE OF A LIFE-TIME

You Are Sure With A Living Fence of Forrest Keeling Type Multiflora Rose

Beat the farm labor shortage which makes fence building and repairing costly. Plan for the future with a Forrest Keeling Multiflora Rose living fence. Developed to serve as a permanent, living fence, to bring protection and economy to farming. Millions of Keeling plants have been used to fence farmlands.

FORREST KEELING TYPE

MULTIFLORA ROSE

Horse High—Bull Strong—Goat Tight

Easily planted — fast growing. Protects against cross-fence transmission of livestock diseases. Upright, thorny, vigorous. Does not sap strength of nearby crops nor grow tall enough to shade them. Does not runner or sucker. Reduces insect damage to crops by multiplying songbird numbers.

Aids in erosion control — acts as a field windbreak, protecting young crops — reduces wind erosion. Planted readily in a straight row or on contour to fit your conservation plan. Send for free literature.

SEND FOR SAMPLE PACKAGE

Compare the Forrest Keeling plants. Note their sturdy nature. Plant them and you'll see why Forrest Keeling plants are superior. Please enclose $1.00 to cover handling and mailing charges. Use coupon — order early.

FORREST KEELING NURSERY

213 Parkway Road Elsberry, Missouri

Hugh Steavenson, Prop., Originator and Developer of Multiflora Rose Fence

FORREST KEELING NURSERY
213 Parkway Road, Elsberry, Mo.

- ☐ Send free illustrated literature fully describing Forrest Keeling Multiflora Rose for fencing.
- ☐ Send sample Multiflora Rose package. I enclose $1.00 for 8 Jumbo type plants to cover postage and handling.
- ☐ Send 100 Jumbo plants $10.00 prepaid.

NAME .....

STREET OR R. F. D. .....

CITY ..... STATE .....

and there is no mastitis present, some dairymen do the job abruptly by sealing the end of each teat with collodion. The udder will swell up some, they say, but she will usually dry off in about two weeks. Another way is to milk her incompletely, extending the between-milking periods. Sometimes a cow can't be dried off entirely. It's best not to force her too much. One of the worst things a dairyman can do is to dry off a cow by taking away most of her feed. The animal will draw on her body for her milk production. The cow is a single-minded lady who will sacrifice her bone and sinew to carry out her destiny, which is to produce milk. It may be practical to take away part of her grain, but she should have plenty of good roughage and water.

A high producer loses flesh while in milk. This must be replaced during the preparation period. A dry cow needs to gain two to three pounds daily—one for her calf and one or two for herself. The reserves she stores away are to be used during the freshening period when the needs for milk production exceed feed intake.

A properly fitted cow will produce 25 per cent more than a cow left to shift for herself. For each pound of gain put on while dry, production by the larger breeds will increase 15 to 20 pounds during the next milking period. In smaller breeds each pound of gain will bring in 12 to 15 pounds of increased production. Larger breeds should gain from 140 to 200 pounds, while the smaller breeds should gain from 90 to 125 pounds during the fitting period. Benefits from fitting the dry cow also show up in easy calving, quick removal of after-birth, fewer udder troubles, and fewer difficulties at breeding time.

Feeding The Dry Cow

The dry cow should be fed an average of 8 pounds of a good quality fitting ration straight from the bag, or a mixture of 400 lbs. farm grains and 100 lbs. of 27 per cent to 32 per cent dairy supplement along with salt and extra minerals. Heavier producers may need more than 8 lbs. of feed per day during the dry period. Feed enough to allow the cow to put on weight. The eye of the farmer will tell him the needs of the individual cow. She should be fat, but not too fat, just in a good, sleek condition. If she is too fat she will "fever up" at freshening time.

If the cow is a high producing animal, good insurance would be to give her a sweet starting a month or so before she freshens. Feed her about a gallon of molasses, a pint or so at a time. This cuts down on the possibility of acetonemia. More than a gallon will do no harm and neither will it do any harm to give it to all cows, regardless of production.

The Freshened Cow

At freshening time, the appetite of the cow is abnormal, nerves are under tension, mammary glands have gone to work to produce milk to feed the calf, and reproductive organs are upset. This is ex-

COCHRAN FARM

Westchester County, North Salem, N.Y.

Top Aberdeen-Angus Breeding Cattle

One of the Finest Herds in the New York Area

Featuring the get and service of:

Prince Sunbeam 405th 1078680 and Ankonian 3216 1186303

G. A. Cochran, *Owner*
Aiken Knox, *Manager*
Wallace Butler, *Herdsman*

CORRIEDALE SHEEP ARE DUAL-PURPOSE

Corriedales produce two crops annually—wool that is excelled by none and lambs that top the market.

For information and descriptive literature, write:

American Corriedale Association, Inc.
100 North Garth Avenue Columbia, Missouri
Rollo E. Singleton, Secretary

WOODBINE FARMS CORRIEDALES

Are the most profitable breed of sheep. We can furnish choice breeding stock of both sexes.

For booklet write

J. F. & H. H. WALKER

BOX 226 GAMBIER, OHIO

HK

SELF DUMPING TRI-TRALOR

No hoist, hydraulic, or P.T.O. system to bother with.

Easiest maneuvering—mounts any farm box.

EFFORTLESS DUMPING IN 1/10th THE TIME ANYPLACE

HOTCHKISS
STEEL PRODUCTS CO.
Dept. 23-D, Bradford, Ill.

pected with calving. Proper feeding will help overcome troubles which occur at calving time.

The day before calving, which should be marked by a ring around the date on the calendar in the kitchen, the cow's feed should be reduced to about 4 lbs. and should be slightly laxative. Hot bran mash is an old standby and is just as good today as it was in grandfather's time, when it was the only feed he knew about for this period in a cow's career. Three or four pounds mixed with hot water into a heavy paste and fed warm is a meal for a cow and it makes her mighty happy on this trying day. If the bran is not available, she may have all she can eat of hay and pasture. During a few hours at most a weight of 75 to 150 pounds is suddenly taken out of the cow's innards. This is a shock and it leaves a yawning vacuum which is better filled up. Plenty of warm water with the bran will be soothing and will fill up the void. A blanket is a good idea too, for body temperature lowers following the shock of birth. A blanket outside and a bellyful of hot bran mash inside will do much to make the cow grateful and she will show her gratitude by making a profit later on.

The day after calving she should have two or three pounds of a commercial dairy feed or a balanced grain mixture. The feed fed during the dry period is best for 30 days. Then switch to the regular milking ration.

The cow should not be completely milked out after calving, for this may induce milk fever. A little milk left in the udder will exert a back pressure which will hold back production, a desirable thing until she recovers from calving. She should not be fed too high for a while. All the good quality hay she can eat, but a stingy ration of grain and silage—not more than a pound or two of grain and ten or twelve pounds of silage. Her feed should be gradually increased after the first week until she is on full feed in about three weeks and is in full production. She may need more time than three weeks; the point is not to force her.

Back Where We Started

The cow is now around the circle. With our most loving care she may turn out to be a dud; and sometimes the cow that we slight for her more favored sisters turns out to be a gold mine. Every dairyman knows that you can't treat them all alike; each is very much an individual with whims, phobias, complexes and habits, very much like his family back in the house eating breakfast.

There are many good methods of feeding, many sound systems and kinds of feed which produce good cows. Any feed or system of feeding is only as good as its variation applied to an individual cow or herd. Today the trend is toward the dry feeding system for calves; for the cows a

WHATEVER CROPS YOU GROW . . .
WHEAT ORCHARDS HOPS, PEAS NURSERIES ROSES
SAGEBRUSH CLEARANCE FOR PASTURES
DAIRYING POTATOES
LEGUMES POTATOES TOBACCO PASTURE CROPS
HAY SPRING WHEAT
OATS CORN SOY-BEANS RYE
GRAPES BERRIES VEGETABLES
COTTON VEGETABLES FRUITS
WHEAT GRAZING LAND IMPROVE-MENT
WINTER WHEAT TOBACCO
PEANUTS COTTON FRUIT
COTTON PASTURE GRASS
SUGAR CANE COTTON
CITRUS FRUITS PASTURES VEGETABLES SUGAR
. . . You'll make more money with the SEAMAN MOTORIZED TILLER
SEAMAN Self-Propelled Tiller. 7 ft. tillage width. Diesel or gas engine powered.

High yield farming, wherever you live, demands tillage which is exactly right for <u>your</u> crops, <u>your</u> soils and the soil condition at the time. Soil types often vary from field to field; so do moisture conditions.

This means tillage equipment which can quickly be adjusted to meet every requirement. And that means the SEAMAN Rotary TILLER.

As a few examples:

Pasture renovation. Generally a cloddy tillage to prevent erosion and to kill out old grass before re-seeding. *<u>The SEAMAN does it!</u>*

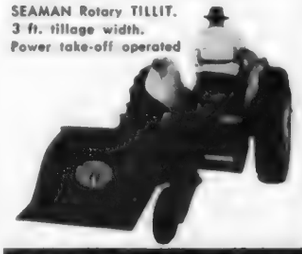
New pasture preparation. Tillage which chops and destroys brush (including sage) or which buries heavy weeds while preparing a good bed for grass seeding. *<u>The SEAMAN does it!</u>*

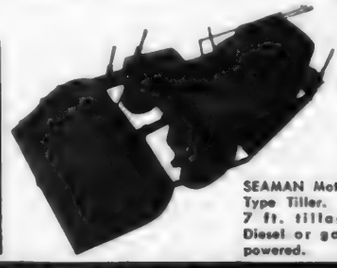
High clay soils. Medium tilth to preserve soil aggregates and prevent "puddling". *<u>The SEAMAN does it!</u>*

Loams and peat soils. Fine pulverization for a well aerated tillage. *<u>The SEAMAN does it!</u>*

Mulching. Tillage in which a surface, shallow or deep mulch is at the operator's command. *<u>The SEAMAN does it!</u>*

FREE — ON YOUR REQUEST — "Benefits of Rotary Tillage". Most comprehensive ever published. Profusely illustrated. Just send a postcard . . . today!


SEAMAN Rotary TILLIT. 3 ft. tillage width. Power take-off operated


SEAMAN Motorized Pull Type Tiller. 6 ft. and 7 ft. tillage widths. Diesel or gas engine powered.

SEAMAN MOTORS, INC. 331 N. 25th Street MILWAUKEE, WIS.

PARAGON SPRAYER No. 3

Handles 12 gallons of any spray solution. Kills pests and parasites on plants, trees, poultry and livestock. Destroys weeds. Whitewashes buildings. Automatic agitation prevents solution from settling in tank or clogging nozzles.

With hose, pipes and nozzles.

Single wheel truck if specified

ELIMINATE CONTINUOUS PUMPING

Model 3-P with 4-gallon compression tank, assures continued spray at high pressure long after pumping stops. It's strictly a "one man job", easy, fast and thorough.

• *Order from your dealer or write for catalog and price list.*

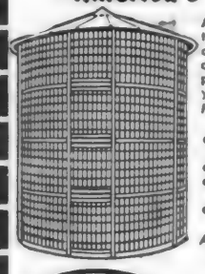
THE CAMPBELL-HAUSFELD CO

21 State St. Harrison, Ohio

IMMEDIATE DELIVERY!

HABCO CORN CRIBS

America's Finest!



Anticipate needs now. Due to steel shortages and the anticipated large corn crop, you will be wise to place your order now with your favorite dealer.

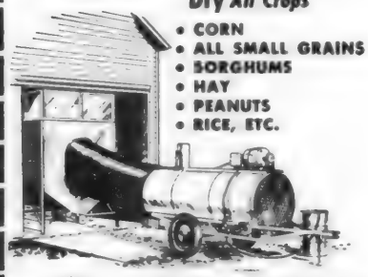
Habco Corn Cribs are all galvanized

- TRIPLE LIFE—COPPER BEARING BAR MESH
- 6x16 PANELS
- EASIEST ERECTING CRIB SOLD TODAY
- PAT. UNDER ROOF CONSTRUCTION

Also Tunnels and Ventilators Ready for Delivery

HABCO JET CROP DRIERS

Dry *All* Crops



- CORN
- ALL SMALL GRAINS
- SORGHUMS
- HAY
- PEANUTS
- RICE, ETC.

PLACE ORDERS NOW With Your Local Dealer

***AVAILABLE NOW*— Habco's new 280 bushel, batch-type Drying Bin and Crop Dryer combination.**

HABCO MFG. CO., Columbus, Nebr.

Please send me complete information and name of my nearest dealer.

NAME_____

ADDRESS_____

FQ-4

scientific cow feed supplemented by grain and good hay, pasture and silage.

The Round-up

To round up what has gone before and to tie it into a convenient package, here is a summary of "round-the-circle-feeding":

1. Feed colostrum milk from dam for 2 to 3 days.
2. Feed milk at body temperature from nipple pail as follows:
   a. 1 pound of milk for each 10 pounds bodyweight or
   b. 3 pints twice daily during first week.
      4 pints twice daily during second week.
      5 pints twice daily during third week.
   c. During fourth week gradually reduce milk until calf is weaned. If calves tend to scour, reduce the amount of liquids fed.
3. Beginning fifth day (or sooner) after milk feeding, teach calf to eat calf starter by putting feed in calf's mouth.
4. At 2 weeks of age provide:
   a. Calf Hay: (timothy, timothy and brome, timothy and clover). Legume hay alone may be too laxative.
   b. Block Salt, mineralized.
   c. Water.
5. Limit calf starter to 5 lbs. daily after first month.
6. Continue to feed calf starter to 4 months of age (about 400 lbs. feed is needed to 4 months).
7. After 4 months of age, change from calf starter to a fitting ration for the growing heifer.
8. Feed fitting ration to growing heifers —3 to 5 pounds daily—even when pasture and roughage is excellent.
9. Last 60 days before freshening, increase fitting ration to 6 to 8 pounds daily.

In areas where grain is plentiful the above feeding program may be altered slightly, grain being substituted for part of the commercial feed. The following feed changes may reduce the cost:

1. Feed 100 lbs. complete calf starter to each calf, then change the ration to:
   100 lbs. Calf Pellets (24% protein)
   100 lbs. Whole Corn
   100 lbs. Whole Oats
   Free choice of mineralized salt, bone meal, mild lime.
2. Instead of fitting ration to growing heifers, feed 3 to 5 lbs. daily:
   200 lbs. Ground Oats
   200 lbs. Ground Corn and Cob Meal
   100 lbs. 27% Dairy Supplement.
3. Last 60 days before freshening, it is advisable to feed 6 to 8 lbs. daily.

More—Much More—
by the Spurway Method

Simplex SOIL TESTING

NO$_3$ P K pH Mg Fe Na Al Ca NH$_4$ NO$_2$ CO$_3$ SO$_4$ Cl Mn

Do your own soil testing

OBTAIN MAXIMUM CROP YIELDS AT MINIMUM COST

The Complete Simplex Soil Test Outfit is practical for use in any locality—requires no waiting—allows for frequent, yearly tests. Contains all the solutions and apparatus necessary for 100 to 300 soil tests for each of 15 important soil chemicals including trace elements, and tissue tests for Nitrates, Phosphorus and Potassium. Solution replacements available.

All outfits F.O.B. Cleveland.
Shipped via Railway Express.
Write for descriptive literature and prices

THE EDWARDS LABORATORY
P. O. Box 2742-D CLEVELAND 11, OHIO

DAISY *Cattle Markers*

DELIVERY ONE TO THREE DAYS POSTPAID

No. 21—FOR NECK. Adjustable chain. Numbered both sides. $13.25 per dozen.

No. 17—FOR HORNS. Adjustable chain. $9.20 per dozen.

No. 25M—Marker Plates without chain. Key Ring Fasteners. $7.50 per dozen.

No. 38—DOUBLE PLATE NECK CHAIN. Upper portion strap; lower portion chain. $14.50 per dozen.

No. 25—DOUBLE PLATE ALL CHAIN MARKER. SOLID BRASS MARKER PLATES, numbered both sides. Chain is brass plated. Weight, 1 lb. each.

Price: $16.75 per dozen

Sample mailed for $1.00. Write for folder.

GOLDEN ARROW FARMS

Dept. 11, Box 7 Huntington, Indiana

2nd Award Winner 1951 National Chicken of Tomorrow Contest

2nd

★

1st for Purebreds

Offering benefits of mass selection and progeny testing for practical farms.

N.H., U.S. Approved—Pullorum Clean

NICHOLS POULTRY FARM, INC.

BOX 31 KINGSTON, N. H.

HOW TO WIN A BLUE RIBBON

(Continued from page 39)

ket where, because of Besuden and his neighbors who raise good sheep, lambs usually bring a few cents more than on any other livestock market in the area. He buys his replacement ewes a month or two later and the cycle begins again.

His western ewes cost more than the native ewes he once used, but Besuden feels that they are worth the extra money. They shear more wool than the natives; at current prices their nine-pound fleece more than pays for their winter feed. They produce a heavier lamb when crossed with Southdown and they are excellent mothers. They and their lambs are more hardy than native ewes and they live longer. Most important is the fact that these uniform Westerns can be bought in quantity as yearlings. F. W. Clay, a livestock dealer in Winchester, has made a business of buying Montana ewe lambs to supply the demand in Kentucky.

What makes for success in the sheep business? Besuden starts at five in the morning with a ride on his walking horse that takes him to all parts of the farm; he starts with a loving inspection of Uncle Jim. "It's a wonderful time of day to be out; the dew is still sparkling and the whole farm is peaceful and sometimes it's covered with mist. It's also an important time to get out among the sheep. I don't know why, but they seem to get over on their back more in the morning. Last year we lost three rams and six grade ewes that way, but I saved a lot more than that by flipping them over. You get so that you can spot a sheep on its back a mile away. I'm so in the habit of looking for them that I spot them in neighbors' fields as I drive along and get out and up-end them and I know that neighbors have done the same for me. You also get so that you can spot a ewe that is off her feed or a lamb that is scouring or is fly struck. This morning, for instance, I painted a fly struck lamb with US 62; if I'd let it go for long it would have been like throwing away $30—saving it cost me a few minutes time and a dab from a 60 cent jar of ointment.

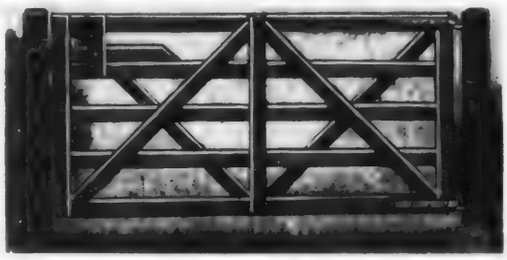
"Sometimes it is just observing how a bunch of sheep is going on a particular pasture," he continued. "Once in a while you'll find them doing poorly at one stage of a pasture's growth. Take them off it for a week or two and then put them back and they do all right. You watch for foot rot; you check their skin and eyes for paleness to see if they have stomach worms. Of course we drench them, but we also feed phenothiazine—one part to nine of salt. At lambing time we check to make sure that the lamb doesn't get separated from the ewe; if a ewe dies we see to it that another ewe takes the lamb; if a lamb dies we put an orphan on the mother. These are details you have to watch if you are going to succeed."

Riding through his flocks several times

FARM FENCES & GATES

POST & RAIL FENCE

Here is the most practical farm fence used throughout America. A strong, beautiful, all-purpose fence that will last for years, free from any upkeep expense. Easy to erect. Post and Rail Fence is ideal along roads and property lines, also as enclosures for cattle and horses. Made of selected hand-split Chestnut. Available in 3 or 4 rail types both standing 4 feet high. Matching gates available in many widths.



"WON'T SAG" FARM GATE

"Won't Sag" Farm Gates are the strongest and heaviest farm gates made. Rails are 1 inch thick and 3 inches wide. Made of Cypress, a long-lasting outdoor wood, this gate is double braced and will not sag or twist. Heavy wood slide holds gate closed. Made in widths of 4 to 12 feet. These gates shipped to all parts of the U.S. complete with hinges. Order one of these gates, you will be convinced that no other farm gates are as heavy as ours.

Write for Booklet and Prices

TIGHT SCREEN • WOVEN PICKET • ENGLISH HURDLE • POST & RAIL FENCES • "WON'T SAG" FARM GATES • SELF-LOCKING FIELD GATES • CHILDREN'S OUTDOOR PLAY-YARDS

Rusticraft FENCE CO.

DAVID TENDLER - Est. 1918 - 20 KING RD, MALVERN, PA.

GREATER PROFITS from Farm Crops!

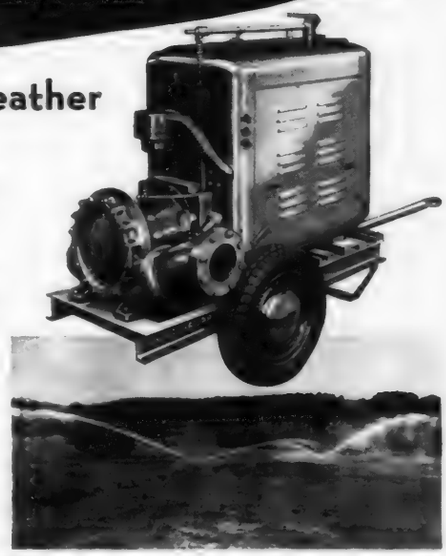
Don't Gamble on the Weather

No farmer who can afford the original investment necessary to put in a crop, should be without the assurance of a **good crop.**

Gorman-Rupp high pressure centrifugal irrigation pumps are **dependable** and provide an unfailing supply of water for producing larger and better crops. **They Never Fail.**

Made in various sizes. G.P.M. varies with lbs. pressure. Ratings from 80 G.P.M. at 75 lbs. to 1250 G.P.M. at 125 lbs. or 3000 G.P.M. at 35 ft.

Send for Bulletin 9-IR11 and Special Folder
"IRRIGATION AT MALABAR FARM"



From coast to coast - with crops of all kinds - farmers are depending more and more on Gorman-Rupp Irrigation Pumps.

Gorman-Rupp Pumps

THE GORMAN-RUPP COMPANY

MANSFIELD, OHIO

EMERGENCY ELECTRICITY at Low Cost!

ONAN A.C. GENERATORS for Tractor Drive

When storms or breakdowns cut highline power, just belt up your tractor to this Onan A.C. Generator. Produce all the electricity you need for lights, milkers, pumps, oil burner, deep-freeze, appliances. Specially designed for tractor drive. Supplies regular 115/230-volt 60-cycle current. 3,000, 5,000 and 10,000-watt sizes.

COMPLETE ELECTRIC PLANTS —for farms with frequent power failures. Powered by 4-cycle air or water-cooled engines. Can be equipped to start automatically when power fails; stop when restored. Easy to install.

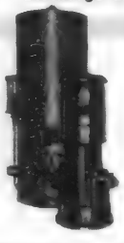
Write for Folder

Onan PRODUCTS

D. W. ONAN & SONS INC.
3224 Univ. Ave., Minneapolis, Minn.

only *Jacuzzi* selective stage JET PUMPS

Pump from depths to 300 feet – AND Discharge at any desired pressure



The Jacuzzi Selective Stage Jet Pump is specially designed for lifts from great depths but it delivers the water at normal tank pressure. No special high-pressure tank is necessary.

With the Jacuzzi Jet, you have no moving parts in the well—no lubrication or loss of pumping time for repairs. The entire Jacuzzi water system will operate automatically.

Jacuzzi also builds a complete line of shallow and deep well pumps including: The Aquamat, Ever-Prime, Vertical and Horizontal Speedi-Prime water systems.

SEND TODAY FOR FREE BOOKLET

JACUZZI BROS., INC. FQ-5
4100 Bayless Ave.
St. Louis, Mo.

Please send me FREE literature on ____ Selective Stage Jet Pumps or other water systems.____

Shallow Well ☐ *type* Deep Well ☐

NAME_____

ADDRESS_____

CITY_____ STATE_____

each day, Besuden has come to know each animal on the place, not just the ram that won the championship at the Illinois State Fair, but also the western ewe that produces good twin lambs every spring and the ewe that isn't doing too well and should be culled. In the heat of the day he will ride into the shade of a locust tree to look over the rangy, long-necked western ewes with their square mutton type lambs. In the evening he may take a visitor in the truck and drive out to look at the grazing sheep spread out over the pastures. Or, more likely, Mrs. Besuden may insist that the guest and the boys, Carlisle and David, drive to one of the dozen or so farm ponds for fishing and a picnic supper. The ponds were built to provide water for the sheep in each pasture, but Bev Besuden has the knack of turning such practical things into devices for pleasant living.

The simple fact that he can drive a truck over any part of the farm that once had gulches deep enough to have hidden the truck in is a part of his reward for farming. In spite of the fact that the soils map shows the top soil to be thin and the slopes too steep for plowing, anyone looking at this grass farm today knows that here is land that is on the mend and is making its owner a living.

Besuden is a past President of the Winchester Farm Bureau, a member of the state livestock committee of the same organization; he is a member of the University of Kentucky committee on animal nutrition, a director of the American Southdown Association, and a member of the Board of Directors of the Cincinnati Branch of the Federal Reserve Bank. These are the honors that have been given to him; then there are those that he and his 17 year old son Carlisle have gone out and grabbed. These honors are represented by the loving cups and the purple, blue and red ribbons from the county and state fair circuit and from the International.

The Besudens began exhibiting in 1941. Since then they have won championships at the Kentucky, Illinois, and Ohio State Fairs. They sold a ram for the highest price that had ever been paid for a Southdown in America, $1125.00, and last year sold the winning carload at the International for the record price of $.75 a pound. This, of course, is considerably lower than the $2.00 a pound that was paid Carlisle for his champion pen of three fat lambs in 1949. "It just happens," Carlisle will explain modestly, "that I'm a better sheepman than father."

Henry Besuden began attending the International in 1933. Each year it was the competition in carload lot of fat lambs division that interested him as a commercial producer. Before he decided to enter the contest he was subconsciously comparing his best lambs with the winning lot sent from Canada by W. J. Brodie of Ontario, who won this event for many

Like Them?

Of course you do . . . everyone does! They are *Shorthorns*, the ideal cattle for American farms. They combine blockiness with size, quiet dispositions and rapid gaining ability. The animals shown above were produced at Elcona Farms, Elkhart, Indiana. Sixty head like them will be sold in the Elcona Farms-Hanson Heights Farms-Garsons Farms Auction Sale to be held at the Indiana State Fair Grounds in Indianapolis on *October 29 1951*. For the beautifully illustrated catalog, address.

HAL LONGLEY, *Sale Manager*
16 South Locust St. Aurora, Illinois

FREE

40 page book gives formulas for dairy herds, swine, beef cattle, sheep, poultry . . . tells about trace minerals . . . analyses 70 grains, proteins, roughages . . . describes functions, deficiency symptoms of essential vitamins . . . shows how to analyse, balance feeds . . . tells how to make low cost, richer feeds from home grains. Ask your veterinarian, or write direct for FREE copy of "VpC Feed Formulas". No obligation.

VITAMINERAL PRODUCTS CO.
PEORIA 3, ILL.

CAMPBELL-HAUSFELD Spray Painting Outfits

SAVE *time, materials and money*

PAINT buildings, tractors, trucks. Refinish furniture and fenders. Inflate tires; lubricate motors and implements. Destroy weeds. Rid live stock and pens of pests and parasites.

First job pays for the outfit. Then it is yours for a lifetime of trouble-free service. 4 models at 4 money-saving prices. If your dealer does not have them, write for literature and prices, giving his name.

pressure queen

The only 4 cylinder portable. Outperforms them all for spray painting without pulsation.

THE CAMPBELL-HAUSFELD CO.
181 RAILROAD AVE. HARRISON, OHIO

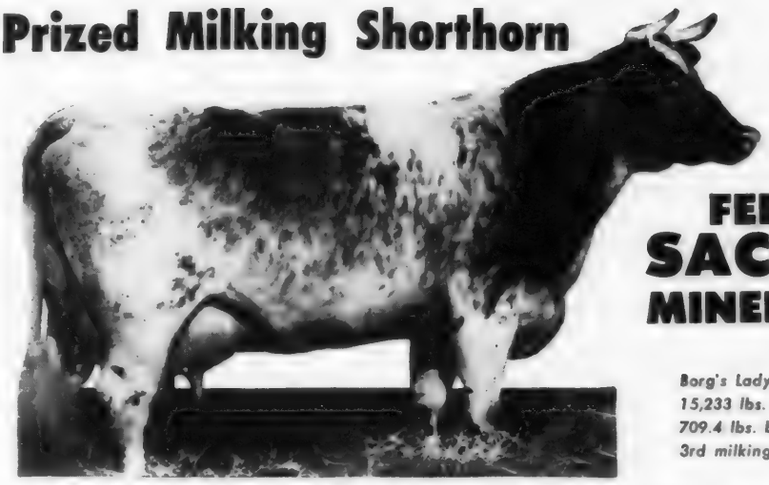
years. "I felt every lamb that I could touch and I got to thinking that some of my lambs would compare favorably with his lot and that there was always enough room between his champions and the second place winners for me to slip in *there*. I really didn't expect my crossbred lambs to beat his Southdowns, but in 1946, the first year I entered, the judges walked between the two pens for what seemed like at least two hours and finally gave my lambs the nod."

Besuden won the carload lot again in 1947 with crossbred lambs, but in 1948 the competition stiffened and Ben Disch, of Evansville, Wisconsin, won with Southdowns. In 1949 Besuden devised a new system for meeting the competition; a system that he still uses. In the summer he goes to all of his friends who raise purebred Southdowns (most of them buy their rams from him) and arranges to buy a few choice lambs from each. In this way he is able to assemble about 80 choice lambs on his place by August first.

"We drench them with phenothiazine and put them on lespedeza pasture and a half pound of oats and corn a day. As the nights get cooler we increase the corn. We'll have them on full feed—a pound and three-quarters of grain, 70 per cent corn and 30 per cent oats—around the first week in October and hold them on it until the show in November. You've got to be careful to see that they eat plenty of roughage during this time or they will founder. We found that you can't feed less than 40 per cent hay without running into danger. Last year, just a week before the show, we tried to cut down on the hay in order to pull in their sides and they started foundering. We had a right smart lot of trouble whipping them back into shape.

"Six weeks before the show we back them down, that is trim the wool flat on their backs to give them a squarer look. Then we wash them—boy what a job that is; you wind up just as cold and wet as the lamb does. Washing the lambs this early allows time for the yolk, the natural oils, to give body to the fleece. A day or two after they've been washed I trim them all into show shape. One man does all of the trimming in order to keep them uniform. I always pick out what I think is the middle lamb and trim him and then trim the others as near like him as I can. If you get one odd lamb he's sure to wind up under the judge's feet the whole time they're in the pen. It's the same with selling—your worst animal will be right in there hobnobbing with the buyers. A friend of mine was selling a bunch of lambs and had one terrible-looking animal. He was so bad that my friend looped a piece of baling wire around his neck and tied him off back in a corner where he wouldn't be noticed. Right in the middle of the sale when all the buyers were in the pen bidding, this lamb breaks loose and comes right out in the middle drag-

Prized Milking Shorthorn



FED SACCO MINERAL

Borg's Lady R 9th
15,233 lbs. milk
709.4 lbs. butterfat
3rd milking year

Borg Farms Have Used Sacco Mineral 17 Years

Borg Farms at Delavan, Wisconsin, have a reputation that's hard to beat as breeders of Milking Shorthorns. Manager Edwin Evans will tell you that Borg's Lady R 9th is one of the best dual purpose cows in America. And he adds, "She has had Sacco V-19 Mineral Feed since she was a calf." That's the usual feeding practice at Borg Farms, users and boosters of Sacco for the past 17 years. Your animals, too, need Sacco V-19 to aid digestion and assimilation. For top milk or meat production, depend on Sacco V-19. It's all quality—24,000 units of Vitamin D added to every pound. Write today for free folder and name of your Sacco dealer.

SACCO V-19 MINERAL FEED

THE SMITH AGRICULTURAL CHEMICAL CO.
Plants at Columbus, Ohio; Indianapolis, Ind.; Saginaw, Mich.; Holland, Mich.; Carey, Ohio.

10 Ways to make farming easier and more profitable!

The ten implements shown here have proven to be a "gold mine" on thousands of farms from coast to coast. They represent the popular Roderick Lean and Harvey "Red-Hed" lines which have withstood the test of time and are continuing to make "friends" wherever they are used. Perhaps, right now, you are using one or more of these quality built farm implements to save time, toil and money on your farm. We hope so . . . and that you will add others to your "staff" as time goes on. In the meantime, why not see your dealer and ask him for a demonstration of any of the implements shown here. He will be glad to do it.

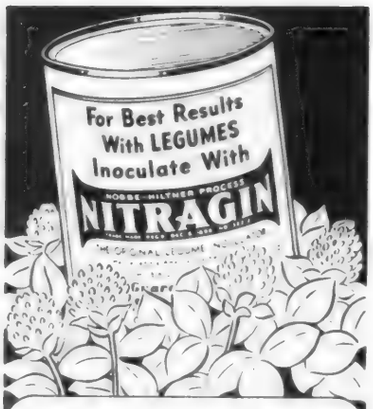
Vulcan ZEPHYR TRACTOR PLOW
Roderick Lean TRACTOR DISC HARROW
Roderick Lean WAGON BOX UNLOADER
Vulcan ROLLER PULVERIZER
Roderick Lean ALLSTEEL FLEXIBLE ROTARY HOE
Roderick Lean WIDE TRACTOR SINGLE DISC HARROW
HARVEY "RED-HED" FARM ELEVATOR
Vulcan SPROCKET PULVERIZER
HARVEY "RED-HED" HAMMER MILL
HARVEY "RED-HED" CORN SHELLER

FARM TOOLS, INC.
MANSFIELD, OHIO, U. S. A.

CUT OUT AND MAIL TODAY!

FARM TOOLS, INC., Mansfield, Ohio Dept. A
Send me complete information about the Roderick Lean, Vulcan and Harvey lines of Farm Implements

Name .....
Address ..... R.F.D. No. .....
City ..... State



**A FEW MINUTES TIME—
A FEW CENTS AN ACRE**
Help Assure
LEGUME SUCCESS

Why worry about your legume crops . . . why gamble with expensive seed and valuable land . . . why not inoculate? Just a few minutes time—just a few cents an acre may make the difference between a great dollar loss or a booming legume success. NITRAGIN helps legumes—it boosts the stand . . . helps the land. Get the easy, inexpensive inoculation habit. Get NITRAGIN in the orange-colored can . . . from your seedsman.

THE NITRAGIN COMPANY, INC.
3927 N. Booth St. • Milwaukee 12, Wis.

This Farm Will Show a Good PROFIT

WADE RAIN
Sprinkler Irrigation

"WATER IS WEALTH"
when You Use WADE RAIN

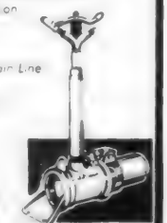
Greatly increases the production of all farm crops — insures rapid growth, earlier maturity. The best insurance against loss of crops during dry spells.

Saves Labor — Time — Water

Quickly pays for itself on all size farms, orchards, dairies, etc.

The Leader in Features

- Coupler Locks from Carrying Position Saves Stooping and Walking
- "Loksvin" Self-Draining Gasket — Can't Blow Out
- Main Line Valve keeps water in Main Line While Moving Sprinkler Lines.
- 100% Aluminum — Light Weight, Easy to Carry.



PLAN NOW Write Dept. 26 for Literature and Name of Your Nearest Dealer

R. M. WADE & CO.
SINCE 1865
106 S. E. Hawthorne Blvd.
PORTLAND 14, OREGON

ging the baling wire. They never did let him forget that one.

"The last few days before the show we're working on them every spare minute we can get in the day and far into the night. We go over each one again and give them a final trimming. By this time we've eliminated some and have the bunch down to about 65. During this final trimming I weed out some more and wind up with 55 to be shipped. About four days before the show we take them up. We load them aboard a truck in the evening and drive them to Chicago that night. We put sand and straw on the truck floor and a divider in the center to keep them from piling up and we make five or six stops on the way to check on them. Carlisle and I ride with the truck cramped up in the cab and it takes two days stretching to get my knees straightened out again.

Mrs. Besuden and their youngest son, David, follow the truck in the family car. In Chicago she takes on the job of keeping up the amenities—entertaining competitors, buyers, and friends, while Besuden is busy with the sheep. This is a task that comes as naturally and pleasantly to her as does her southern accent. David, who is seven, has but one responsibility during the show, to cheer for the home team.

"In Chicago," Besuden continued, "you pen your lambs and from then until the show you watch them like a hawk to see that they don't get off their feed. I'm one of the few there who acts as his own shepherd, which makes it pretty hard on me. I have to visit around in the evening with the other breeders to meet the men that might want to buy my Southdowns and then I have to get up and get out of the Loop and down to the stockyards at dawn to take care of the sheep. Each year I have won they've given me the silver medal that goes to the winning shepherd as well as the owner's ribbon. I had the medals all mounted on a bracelet for Bev, my wife, but I wonder if it's worth it.

"On the Saturday the show opens you make your final eliminations and take 51 from the stockyard pens to the show pavilion. You always take an extra just in case one should drop dead or lightning should strike. There are usually around 35 or 40 lots competing. The judges make a quick trip through all of the pens to give them an overall impression and then examine them more carefully. Finally they concentrate on two or three. It seems that they work through your pen for hours, feeling the ones you wish were just a little fatter, passing up the perfect ones. Finally they make their decision.

"It's a real thrill to win the International; I'd rather win it than any show on earth. And I'm really out to win; the time I took second I was a hard man to live with until I began planning my next year's campaign."

CARDINAL ELEVATORS
A SIZE TO MEET EVERY FARM NEED

At left, Cardinal Junior. Sturdy aluminum. Portable. Lengths—12, 16, 20 ft. Assembly for mounting motor over or under trough. Grooved sprocket and cutter blade. Eliminates feed and litter ball-up.

Cardinal makes two big elevator models. Cardinal "500" (illustrated), lenghts 26 to 50 feet —Cardinal "Skipper," lengths 24 to 48 feet. Equipped with exclusive drag-line shock absorber.

Save time, manpower with Cardinal. Literature and dealer's name on request.

LML ENGINEERING & MFG. CORP.
621 E. CHAUNCEY ST., COLUMBIA CITY, INDIANA

Mastitis IS BEING CURED

We supply all latest effective treatments including **PENICILLIN, AUREOMYCIN, STREPTOMYCIN** and **"SULFA"** drugs to meet all types of the disease. Everything you need in the veterinary line at reasonable prices. WRITE for particulars.

ANCHOR SERUM CO. of IND.
INDIANAPOLIS 6, INDIANA

PLAY SAFE! TEST THE MOISTURE CONTENT OF ALL CROPS WITH
***American* ALL-CROP MOISTURE TESTER**

ONLY $68.00
COULD SAVE YOU THOUSANDS
WRITE FOR DETAILS

A truly accurate and quick method of knowing moisture content in your crops. Enables you to control harvesting scientifically. Used by leading farmers everywhere.

For hay, grain, seeds. All electric simple operation.

American CROP DRYING EQUIPMENT CO.
CRYSTAL LAKE, ILLINOIS

PARKS' BARRED ROCKS

WORLD'S OLDEST STRAIN
ONE BREED ONLY

Big Birds—pullet body weights average 6.5 lbs. Terrific Layers—official records to 349 eggs. U.S. Pullorum Clean. Rugged mountain-grown stock. Also Sex-Link Crosses. Write for free catalog.

JOE PARKS & SONS, ALTOONA, PA.

HASCO EAR TAGS
CATTLE SHEEP AND HOGS

No. 136
Used by U. S. Dept. of Agriculture, State Depts. and prominent breeders. Pliable, rust-resistant steel.

ORDER NOW!—PRICES INCLUDE NUMBERING!

No. 136 SALES TAG		EAR TAGS		
Quantity	Price	Quantity	Hog-Sheep	Cattle
100	$1.65	50	$1.05	$1.80
500	7.30	100	2.75	3.10
1000	11.90	300	5.95	7.50
F.O.B. Newport, Ky.		Applicator $1.85		

Stamping name and address on any quantity ear tags, $1.65
BULL RINGS, CATTLE LEADS, ETC.—SEND FOR PRICES
National Band & Tag Co., Dept. 6-354, Newport, Ky.

TRACE MINERALS AND THE FARMER

(Continued from page 59)

One of the reasons why European soils show little or no trace mineral deficiencies is that for hundreds of years the farmers have been liberal users of manure. Through manure a large amount of the minerals taken out of the soil are put back and not sold off the farm. Each year, through natural chemistry, certain additional amounts are made available to plants. However, the manure on a farm, in itself, can not supply more trace minerals than were contained in the grain and hay, from that farm, fed to the animal. When feed is brought in from outside, if you are lucky enough to have it come from an area rich in trace minerals, the manure will be rich also.

Once in a while there's an exceptional farmer who doesn't want to wait until the scientists have a convenient package for him. He branches out on his own. Forest Borders, a dairyman and farmer of Bowling Green, Kentucky, is adding, each year for ten years, one tenth of the recommendation from a quantitative soil analysis. He pulled "one tenth" out of his hat; he doesn't rightly know why he chose that fraction. He hopes in this way to keep away from too much at one time and eventually to find out the exact needs of his crops and soil. His plan worked. He is growing fabulous crops. He had the wisdom, before starting his trace element application, to bring his farm up to a high level of fertility by crop rotations and the application of copious manure and commercial fertilizers.

Livestock Deficiency

If the deficiency shows up in your livestock, then you can do one of two things: (1) you can put the mineral directly into the animal's feed, or (2) you can put it in the soil, where the plant will take it up and pass it along to the animal.

If the trace elements are given as feed, they can be added to the regular feed or fed as free choice. A mineralized salt is good for ruminants and hogs, but of course won't do for poultry. The requirements of poultry, ruminants and hogs are different, but many feed and mineral makers use a shotgun mineral mixture which does very well for all three under the average conditions. One such mixture, or a variation of it now being used by many feed makers, originated in the laboratory of Dr. Frank Gilbert of the Battelle Institute, Columbus, Ohio. The basic formula follows:

Mineral Supplement

40 per cent 200 pounds steamed bone meal (65.2 pounds calcium, 30.4 pounds phosphorus).

English Type
RAIL and HURDLE
FENCE
Large Stocks . . .
Prompt Shipments . . .
Hand Split Chestnut Rails.
Peeled Chestnut, White Cedar
or Locust Posts
WHITE CEDAR
SCREEN FENCE
For Privacy
Used around swimming pools, gardens or as boundary fences. Small animals cannot pass. Various heights which can be varied in curves or rectangular breakdowns.
All Copper
LANTERNS
Electrified
RUSTIC TABLES
6 and 8 ft. long, frame work—Northern White Cedar. Tops and seats—Western Fir.
Write for Catalog . . .
WOOD PRODUCTS CO. TOLEDO 12, OHIO

CUT FERTILIZER COSTS
WITH THE Hercules SPREADER
Save fertilizer and lime spreading costs with the Hercules non-waste method of distribution. The Hercules Spreader discharges fertilizing material in a smooth, even flow just above ground level, with practically no dusting. Covers 20 ft. width at a single pass, releasing any desired quantity of material from 200 lbs. to 8000 lbs. per acre. Controlled, even spread prevents soil burn, spotty concentration of materials—eliminates guesswork.
If you want to cover more acreage, faster, more efficiently and more economically, the Hercules Spreader will do the job best.
Mail coupon today for descriptive literature
HERCULES STEEL PRODUCTS CORPORATION, Dept. 110, Galion, Ohio
Please send me additional information on the Hercules Fertilizer and Lime Spreader.
NAME
P. O. ADDRESS
CITY
STATE

SKINNER

sprinklers for portable pipe systems

. . . a size to meet every watering requirement

"the quality line"

Skinner offers you the most complete and most dependable line of agricultural sprinklers ever made available. With diameter coverage from 22′ to 390′ and discharge from 1 GPM to over 400 GPM, there is a Skinner Sprinkler to meet your every need.

Each Skinner Sprinkler is sturdy and compact, has an easily adjusted rotation speed, gives you uniform distribution of water and trouble-free operation. All parts are brass, bronze, or stainless steel and are replaceable. Write for complete data.

The Skinner Irrigation Co.
200 Canal St., Troy, Ohio

PREPARE NOW FOR WINTER WATER NEEDS

with a "farm-sized" MYERS Water System

Plenty of pump capacity . . . all the running water you need to promote more productive farming and healthy, happy living . . . that's what you expect when you buy a new water system. And that's why you're *triply* wise to see your Myers dealer *first:* (1) He can draw on America's widest—and most widely accepted—line of water systems to match both *your* capacity requirements and well conditions. (2) Any Myers model he recommends and installs can be depended on to measure up in every way to your highest expectations. (3) He offers complete, expert service. Coupon brings dealer's name and free catalog.

MYERS — 1015-J1
THE F. E. MYERS & BRO. CO.
Ashland, Ohio

Send free Water Systems Catalog to:

My Name_____

Street or R.F.D._____

Post office_____ State_____

40 per cent 200 pounds ground limestone (variable in per cent of calcium up to 38.5 per cent but averaging about 30 per cent. 60 pounds calcium).
19.4 per cent 97 pounds sodium chloride.
0.36 per cent 1.8 pounds ferric oxide (iron).
0.2 per cent 1 pound manganese sulfate (commercial grade 65 per cent $MnSO_4$).
0.02 per cent 0.1 pound copper sulfate.
0.01 per cent 0.05 pound potassium iodide.
0.01 per cent 0.05 pound cobalt carbonate.

100 per cent 500 pounds

One per cent of this mixture is usually adequate to guard against deficiencies of trace elements, and not over five per cent should be used if it is included in the feed at all times.

Pregnant and lactating animals would require more phosphorus than fattening animals; and cattle and sheep more than horses, swine, and poultry. Therefore, where the phosphorus requirement is greater, the per cent of the mixture may be increased a reasonable amount without harm.

In commenting on this mixture, Dr. Gilbert says, "There is little advantage in placing minerals in a feed if they are sufficiently duplicated by other additions. For example, all of the sodium needed in the animal body can be given in the form of common salt. Sulfur is a constituent of protein and if an animal receives sufficient protein, it receives sufficient sulfur. It is questionable, therefore, whether the addition of a mineral such as sodium sulfate or elemental sulfur is worth the cost of placing it in the feed: although, of course, their presence there is not objectionable. Another point to be taken into consideration is that inorganic sulfur has been shown to be unavailable to the animal. Therefore, any sulfur added as the sulfate, or in elemental form, would be superfluous insofar as its nutritive value to the animal is concerned.

"It is not necessary to go to the cost of adding certain elements to a feed if no known deficiencies of these elements have ever been known to occur in animals under natural conditions. The examples are magnesium and zinc. The animal body requires these elements in such small amounts that, so far as is known, an average diet will supply all that is necessary. In the case of magnesium, an additional supply is usually furnished with the limestone supplement, the exact amount depending on the amount of dolomite in the limestone used. More than enough zinc is present in the regular feed.

"A general supplement for farm livestock should contain, therefore, a sufficient amount of the essential minerals to meet the minimum requirements of all species of farm animals, regardless of the locality where the animal is being fed. This might result in some cases in a higher percentage of a mineral than

BOWSHER FEED PORTABLE MILL

Grinds palatable, digestible cobmeal, shelled corn or corn cobs to any practical fineness without dust. **150 to 250 bu. per hour.**

With P.T.O. DRIVE

Hopper adjustable to 3 positions; spout swings in complete circle; saving one-half the shoveling. Hundreds of prominent users. Satisfaction or Money Back.

THE N. P. BOWSHER CO., INC.
915 S. Webster St. South Bend 21, Indiana

Join the ranks of Successful Breeders Using—
BREEDER-ADE® OIL

. . . for surer pregnancies . . . for better young

Follow the lead of successful breeders in all parts of the country—feed Breeder-ADE Oil before mating. This blend of carrot oil, wheat germ oil and "D" activated animal sterol successfully combats nutritional sterility. **4 oz. only $1.80 postpaid!**

Put Breeder-ADE Oil in feed of horses, cattle, swine, dogs, poultry and fur-bearers. Dosage varies according to size of animal—follow simple directions in Bulletin 23 sent in each package. Orders shipped same day received. Send check or money order for $1.80. Money back if not satisfied. Breeders who have tried it reorder year after year.

NUTRITIONAL RESEARCH ASSOCIATES
SOUTH WHITLEY, INDIANA
Department A-3, ®Trade Mark

DRY CROPS QUICKLY!
WITH *American*
ALL-CROP DRYER
•SEEDS •GRAINS •HAY
•ALL FARM CROPS

ALL-CROP DRYERS prepare your crops for top market prices or safe storage. Find out how you can increase your profits with this equipment.

American CROP DRYING EQ. CO.
CRYSTAL LAKE, ILLINOIS

20 Million Trees a year

Evergreen Seedlings and transplants as low as $16. per thousand. Also Shade and Hardwood Seedlings. 6 to 10 ft. Fruit and Shade trees. For catalog and Christmas Tree Grower's Guide, write to box 6-I.

MUSSER FORESTS, INC.
INDIANA, PA.

FREE CATALOG

All The Best and Latest Garden and Farm Books, Bulletins

A wealth of up-to-the-minute expert advice on how to do wonders on a little land or a thousand acres . . . wonders with flowers, vegetables, fruits, landscaping, poultry, livestock, woodlands, fishponds, composting, soil improvement, etc., etc. Just send name and address for this fascinating FREE catalog by return mail.

COUNTRY BOOKSTORE
Box 3110 Noroton, Conn. Estab. 1943

would be necessary for one type of livestock, but the convenience of a single general mineral feed would more than offset this.

"The only elements required in a mineral supplement, so far as is known today, are: phosphorus, calcium, sodium, chlorine, iron, manganese, copper, iodine, and cobalt. Phosphorus is usually supplied in the form of steamed or raw bone meal, bone black, rock phosphate, or superphosphate. The most economical form may be used, but some superphosphate and rock phosphate are objectionable because of their high fluorine content. Calcium is used chiefly in the form of ground limestone, ground oyster shell, or marl. Usually ground limestone is the cheapest and most convenient form to use in a supplement. There is, of course, no substitute for common salt. Iron may be included as the oxide, chloride, sulfate, or other simple form. Copper is usually applied as the sulfate, and iodine as potassium iodide. Cobalt has been used in several of its salt forms and there is little preference for any one of these providing it is in a form that can be easily mixed with the supplement."

What About Us People?

We have been told by men of medicine that the average span of a man's life might be well over a century. It is now over 65 years and going up slowly. Perhaps the trace minerals will be one of the factors in edging it toward the century mark. One of the best means of preventing minor-element deficiencies in man is through the eating of a variety of foods from a variety of origins. When the housewife lays in her week's supply of food she buys products of many lands, many soils—coffee from Brazil, lemons from California, olives from Spain, lettuce from Florida. It would seem that all man's minor-element requirements would be adequately met. But this is a hit-and-miss system. It doesn't work very well in the Tennessee mountains, where many people are definitely suffering from trace mineral deficiencies.

Fortunately we consume large amounts of meat, eggs and milk, all of which are likely to contain adequate minor-elements. Animals screen their food, eliminating non-essential and injurious elements and concentrating needed elements. Animal diet is more scientific in America than human diet; we get the benefits second hand by eating the animals.

The livers of animals serve as storage agents for minor elements, and this no doubt accounts in large part for the fairly widespread practice of eating liver regularly once a week. The same applies to the weekly eating of fish. Salt-water fish certainly has considerable value as sources of minor elements, since the sea contains traces of all the elements. The substitution of sea salt for the highly refined product the housewife now finds on the

HERE'S GOOD NEWS
FOR DAIRY AND BEEF CATTLE FARMERS

THE BEST WAY TO USE MANURE

The Cobey Power-Driven Spreader has solved the problem. The TOP EFFICIENCY of this spreader, regardless of field or weather conditions, gives you these definite advantages:

★ You can spread manure DAILY the year around and conform to state laws and dairy regulations.
★ You can do the job QUICKER because the Cobey Spreader carries BIGGER loads, travels and spreads faster than any other.
★ By daily spreading you obtain as much as 50% MORE fertilizing and humus value.
★ You get DOUBLE usage because the Cobey Spreader is convertible to a SELF-UNLOADING WAGON.

Sounds worth looking into, doesn't it? Fact is, the whole Cobey line is worth looking into! Fill in and mail the coupon today for complete data.

THE COBEY CORPORATION
Dept. FQ-91 Galion, Ohio

3 SIZES
MODEL 75
Capacity 75 bu.
MODEL 100
Capacity 100 bu.
MODEL 150
Capacity 150 bu.

Patents Granted and Pending Trade-Mark reg. U. S. Pat. Off.

RETURN COUPON FOR LITERATURE

THE COBEY CORPORATION, Dept. FQ-91, Galion, Ohio
Please send me complete information on items checked.
☐ Power Driven Spreaders ☐ 11-A, Wagon Gear
☐ 31-A, Dump Wagon ☐ Utility Wagon Boxes
☐ 21-A, Hi-Speed Wagon ☐ 2-Wheel Trailer
☐ 2-Wheel Tilting Platform Wagon
Name.....
Address.....
City..... State.....

READY TO BEAR
PLANTS and TREES

State Inspected Stock

Why wait? Have fruit to eat and sell in 60 days this year. Our bearing age fruit plants come in all popular, proven varieties at money-saving prices. HIGHEST QUALITY.

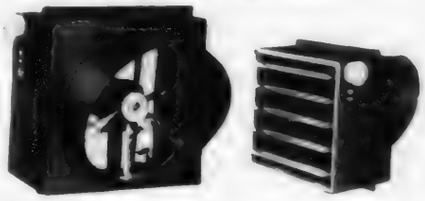
New EBONY Blackberry
Heavy annual bearer. New REDRICH Everbearing Strawberry . . . New MORRISON Black Raspberry . . . YELLOW Raspberries. WHITE Blackberries. Cultivated Blueberries—easy to grow, hardy.

Quintuplet Apple Tree
Amazing! 6 different varieties on one tree. Saves space. Fruit all summer and fall. Fig and nut trees. DWARF and standard Fruit Trees, Evergreens, Shrubs. Everblooming Roses, Perennials. Complete line. 20% discount on early orders. Catalog FREE.

Write for FREE CATALOG "Garden Success"

SOUTH MICHIGAN NURSERY
Box 357 New Buffalo, Mich.

HAVE FRESH DRY AIR IN YOUR DAIRY BARN THE YEAR AROUND



Government tests prove that proper ventilation of farm buildings increases production, protects health, prevents building deterioration. That's why more and more farmers are installing an Aerovent Venti-Pack—the ventilating fan that provides automatically controlled ventilation at all times. Venti-Pack is rugged and dependable. Easily installed, it operates on ordinary lighting circuit. There is an Aerovent Venti-Pack to fit your particular needs. Write for details today.

AEROVENT FAN & EQUIPMENT, INC.
P. O. BOX 28 DEPT. 8 LANSING, MICH.

grocery shelf would go a long way in supplying minor elements to our food.

Dreams About a Laboratory

Recently there has been much talk about having a large central spectographic laboratory, operating on a mass-production basis, to which anyone who desired could send samples of soils, plants, and animal parts for analysis for their minor-element content. Dr. Firman E. Bear, of New Jersey, one of our foremost soil scientists, says, "This idea has many interesting and attractive features, but is being opposed by some of the States on the ground that they want to keep recommendations of their own soils in their own hands. Among the advantages of a big central laboratory would be the rapidity with which the analyses could be made, the accuracy that should go with the best of equipment and with much practice, and the relatively small cost per analysis on such a large scale.

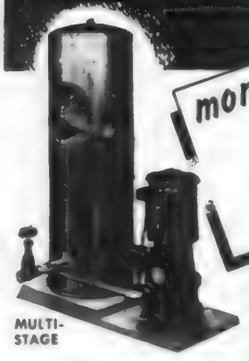
"But there are several bugs that we must take out of the ointment before we can go ahead. The problems involved in choosing dependable samples are so great that even the best research men are troubled by it. Spectrographic analysis of soils for minor elements are very difficult because of the mass of other minerals in them, and they provide no clue as to the availability of the supplies found. Interpretation of minor-element data is often very difficult because of the dearth of information concerning the quantities of minor elements required by plants and animals.

"For satisfactory results from such an enterprise, it would be necessary to have a highly capable director in charge. He would need some well-qualified assistants to keep in touch with research laboratories dealing with minor elements and to follow up all abnormal results to the end that dependable clues were developed. At best, however, such a laboratory would be of value only as a supplement to the vast amount of research required to determine the functions of these elements and the quantities required for normal growth and health of plants and animals."

Where Do We Go From Here?

The problem of how to reach the farmer and to convince him of the importance of the minor elements to his crops and livestock is not one of the easy ones. A man who is accustomed to hauling nitrogen, potassium and potash to his cornfield in a truck is likely to cast a cold, fishlike glance at a package of cobalt no larger than his fist which he is told is enough for an acre, provided his soil needs it. Then, too, he knows that the scientists and professors haven't got all the answers and they don't agree on some they have. His confusion is compounded: he does nothing, and you can't blame him.

Rugged UNIVERSAL PUMPS



MULTI-STAGE

Larger capacities at higher pressures on Deep or Shallow Wells. Plenty of water from depths to 300 feet or more.

Universal Pumps and Water Systems are engineered to meet tough, exacting demands of 24-hour service in home, farm and industry . . . 300 models . . . for complete satisfaction install a Universal . . . Injector or Centrifugal Pumps.

Send for Literature.

UNIVERSAL MFG. CO.
1440 SAN PABLO AVE.
BERKELEY 2, CALIF. Q-3

"There's a Universal for you!"

New Riding BUZZ MASTER

Now! Clear land *easy!* Stop *walking* . . . ride in comfort. New sulky fits all 3 larger Buzz Masters. Makes cutting brush or mowing pleasant. Easy to handle, attach and take off. Ride to and from your work. Clears ground of brush, saplings, undergrowth. Other features include swivel axle, adjustable saw shaft, third wheel for walking models. Adds profitable acres. Big demand working for others in off seasons. Outdates all other land-clearing machines. 7 other models. Write for Free details.

OTTAWA MFG. CO., 1-189 Walnut St., Ottawa, Kans.

PROFESSIONAL FARM MANAGEMENT

Are you getting the most from your farm? Is the fertility of your soils improving or declining? Are your tenant arrangements mutually satisfactory? Are your buildings being maintained and improved?

It will pay you to have a Professional Farm Manager analyze your farm—report fully on conditions—and make recommendations as to the best type of operation. By careful planning you will be assured of maximum returns.

For information about Professional Farm Management Service in your area,

Write

H. E. STALCUP, Secy.-Treas.
American Society of Farm Managers and Rural Appraisers
Box 67, Storm Lake, Iowa

DO YOUR CHRISTMAS SHOPPING FROM YOUR EASY CHAIR!

You can shop by mail. The most appropriate Christmas present for those good farm friends of yours is FARM QUARTERLY. Enclosed in this issue is a postage-paid order envelope. Mail it in today with your check. We'll send each friend a card signed with your name, announcing your thoughtful, year 'round gift.

A CONNER PRAIRIE BOAR
MEANS BETTER HOGS
CHEAPER

Minnesota No. 1 — Montana No. 1
Minnesota No. 2 — Maryland No. 1

Incross Boars Too

CONNER PRAIRIE FARMS
R. 4, Noblesville, Indiana

BEAUTIFUL REGISTERED DALMATIANS

5 Months Old — Black & White, Liver & White, Male or Female.

Sire—Champion Williamsdale Rocky

CAROL BENNETT
MOntana 5479
5053 Casa Loma Rd. Cincinnati, Ohio

HAMPSHIRE SHEEP

Grand Champion wether 1948
Grand Champion pen wethers 1949 and 1950 Chicago International

Information and breeders list

AMERICAN HAMPSHIRE SHEEP ASSN.
72-Q WOODLAND AVE., DETROIT 2, MICH.

AFRICAN WHITE GUINEAS

Pair — $10.00

Heavyweight Dual Purpose White Poultry

White Cornish — Muscovy Ducks

Polled (Beef) Shorthorns

Welsh Mountain Ponies

GRAZING FIELDS
BAY END, BUZZARDS BAY, MASS.

MILKING SHORTHORN CATTLE
"The Breed that Fills Every Need"

Milking Shorthorns are the oldest but also most MODERN of improved cattle representing 65% of all the cattle of England! Reason? THEY PAY!

Dual-Purpose qualities make Milking Shorthorns farmer's favorite and America's Fastest Growing Breed!

For FREE information about Milking Shorthorns and FREE copy of Milking Shorthorn Journal write:

American Milking Shorthorn Society
313 S. Glenstone Dept. FQ Springfield 4, Mo.

BARN ART

(Continued from page 71)

right colors. They will buy the most expensive paints, the best brushes. Not Frank Engebretson. He goes into the local hardware store, picks out a dozen different regular colors in oil and selects brushes right off the counter.

"Seems to me when you're painting barns, that barn paint is the right thing to use!"

Before he starts a new mural he has a chat with the farmer. If the man doesn't have a particular subject in mind, the artist will do an original. He finds out what his client's likes and dislikes are, what kind of a person he is. Then he makes a sketch of a scene he thinks would fit the personality. After blocking out the sketch carefully, he blocks out the side of the barn in proportion. First comes a coat of flat white paint and then he starts to work in a whirlwind fashion. There isn't a wasted motion, a lost minute. He is no longer the calm, easy-going Norwegian. He steams through a large mural in a week and one of the average size, 40 to 70 feet, takes two or three days. The completed mural is covered with linseed oil and will withstand wind and weather for ten years or more.

If you went to call on the artist after a hard day's work, he'd greet you at the door in simple work clothes. He'd call his calm, smiling wife, and she'd bring you a cup of coffee. The pot is always on the stove.

The 69-year-old Engebretson has three children, two boys and a girl. His family tree has sprouted many musicians, but there isn't a sign of a paint brush in the foliage.

Times are good for the artist today. A steady stream of friends and tourists walk up the front path every day. You wouldn't have much trouble finding the house. A native would tell you to go up Third Street, turn north and drive until you saw the picture of the old covered bridge painted on a barn. The bridge was torn down but that was Frank Engebretson's way of saving it for the townspeople.

Farmers have come to him from all over the country to persuade him to paint murals on their barns. But Engebretson is a Wisconsin man who gets homesick for the feel of his state when he's away from it for more than two or three days. That's why Green and LaFayette Counties are unique in their number of murals.

Even Florida can't hold him for long. He goes south in the winters to avoid Wisconsin's cold winds. He lives in his trailer in a camp in Sarasota. He tried leading the lazy life, but he couldn't be idle for long. When a friend asked him to paint his screen door, another unique idea was born. He asked, "How'd you like a picture on it?" And the next morning his friend's door blossomed with a landscape, a Wisconsin landscape, of

New Holland's "77" automatic twine-tie baler can package *up to 10 tons of hay per hour*—hour after hour!

"You can count on New Holland for highest capacity–highest performance"

says Walton W. Thorp—Thorp Hereford Farms, Britton, S. Dakota

Walton W. Thorp with TH Royal Domino 37th, bred on Thorp Hereford Farms.

● "When you're putting up enough feed to carry 1,000 registered Herefords through one of our long Dakota winters, the hay season seems mighty short," says stockman Thorp. "We depend on our "77's" to get an important job done fast, and they have our highest recommendation."

There's only a slim margin between good hay stored in the barn and spoiled hay lying in the field. You can count on a New Holland "77" baler to make that difference.

The "77" with its high capacity—up to 10 tons an hour—helps you beat rain and sun damage. The "77's" floating pick-up handles the windrows big as they come. Its open-end feed auger sends a steady flow of hay to the baling chamber without clogging. Inverted twine knotters clean themselves—tie hundreds of bales without a miss.

Baling action is designed to save nutritious leaves and blossoms. This assures high quality feed for your stock without costly grains.

You have little "down time" when you bale with a "77" All steel in construction, it has 20% fewer parts. 500 owners reported an average maintenance of less than $21.40 per season—many had *no* maintenance costs.

These are some of the reasons why farmers count on the "77" to put up good hay as fast as possible and at the lowest possible cost. For details, see your New Holland dealer soon. New Holland Machine Co., New Holland, Pa. A Subsidiary of The Sperry Corporation.

New Holland Twine is certified by the United States Testing Co. to have met its rigid standards of uniformity, quality and strength.

NEW HOLLAND

"First in Grassland Farming"

Minneapolis • Des Moines

Kansas City • Brantford, Ontario

FREE Check catalog you wish and mail coupon to: New Holland Machine Co., 909 Ash St., New Holland, Pa.

☐ Twine-Tie Baler ☐ Wire-Tie Baler ☐ Forage Harvester—Row Crop or Hay Unit ☐ Forage Blower ☐ Baler Twine ☐ Baler Wire ☐ Side Delivery Rake ☐ Tractor-Mower ☐ Portable Tractor Saw ☐ Farm Wagon

Name_____

Street or RFD_____ Acres Farmed?_____

Town_____ County_____ State_____

course. That started a landslide business. Every man in the trailer camp wanted his screen door beautified.

He wasn't happy there, for Florida wasn't Wisconsin; he'd rather sit in his kitchen back in Brodhead and paint pictures or climb up on a ladder when the weather is nice and paint a picture on a friend's barn.

If you drive through southwestern Wisconsin in summer, you might see him, up on a ladder with a half dozen different paint brushes in his hands. He'll be doing a country landscape on the side of a barn, or he may be repainting one that has grown dim with age. "I've had to repaint many of my originals," he says, "but if a mural is worth doing once it's worth doing again."

THE AUTHOR: James A. Schwalbach has a long and varied career in extension work and teaching in the field of fine arts. Most of this work has been done in Wisconsin, where he learned a couple of degrees in art education. He is now extension specialist in Art and Design at the University of Wisconsin, where, as he explains it, "My job is to stimulate and encourage creative expression in arts and crafts in rural areas." He has known barn muralist, Engebretson, for many years.

THE FARMS OF SPAIN

(Continued from page 29)

do. There is laughter and song in Spain; little girls play hopscotch in the dusty streets; from a darkened doorway comes the strains of La Paloma, played softly on a concertina: and in all of Andalusia one can scarcely find a woman who does not wear a flower in her hair.

Serdon Farm

Occasionally in the river valleys of the plateau, where irrigation is possible, there will be greenness again, a few trees, and an easier way of life. In such a happy valley is Serdon Farm, an estate of 1800 acres on the Duero River near Valladolid. Although many of the people in the villages own their own small farms, Spain has its share of large landowners. The old aristocracy has large holdings and in recent years some industrial money has gone into the country.

The Serdon estate was founded by the grandfather of the present owners who made a fortune from the manufacture of cigarette paper in a small, water power mill, still standing on the farm. The farm has been incorporated by the two heirs, Rafel Alonso Las-Heras and William Alonso Las-Heras, and is managed by a son of Rafael, Jose Alonso. The labor manager is Jose Gamazo, a peasant farmer who worked up the ladder.

Serdon is a small self-contained and self-sustaining village. Thirty-two families live in two and three room homes which huddle together around the manager's quarters, a maze of stables, sties, store rooms, granaries, wine cellars and living quarters with common walls and courtyards.

The farm maintains a school at its own expense. It occupies a large room over the

Increase Farm Profits– Save Labor

You can save about 50% in Corn Storage Space—Cut Labor and shipping expenses—by shelling your corn with a BELL low-cost, light running, ball-bearing SHELLER. It shells from 135 to 180 bushels per hour, delivering clean, shelled corn about as fast as you can shovel it into the low-built, easy-feeding hopper . . . If you sack it for storage, use the 2-bag sacker as shown, or a wagon loader which elevates the grain to truck or bin. A cob shaker or cob elevator is supplied as optional equipment . . . All described fully and clearly in a Special Folder which we will be glad to send you upon request.

Made by the Makers of "Bell" Hammer-Mills

An old, established firm, making Feed Grinding Equipment. In business for over 90 years. You know about "BELL'S" Hammer-Mills, hand-shellers and other farm equipment. Now we want you to know about this, our latest product, the New Ball-Bearing Corn Sheller. Drop us a card and get the facts. Find out WHY this sheller is superior in so many ways, and how it can help you save money and get more profit out of farming. Write us today. Please address Dept. "F".

The **C. S. BELL CO.**
Manufacturers
HILLSBORO, OHIO

Ariens

AMERICA'S FIRST
ROTARY TILLAGE
STILL AMERICA'S BEST!

ARIENS TILLER. All-purpose rotary tiller. 3 models: 7, 9, 12½ h.p. 4-cycle Wisconsin engine. 2 speeds forward; reverse. Heavy-duty steel tines. Full width tillage; 2 to 10 in. deep. Ruggedly built; field-tested—thousands in use!

ARIENS TILLIVATOR for row crop cultivation. Cuts labor needs over 50%. Kills 2, 4, 6, 8 or more rows of weeds at a time. Easy to handle. Accurate depth control. Models available for many makes of tractors. Pays for itself in two years or less!

Write for information.

Ariens COMPANY
BRILLION WISCONSIN

More thorough
INOCULATION for all your LEGUMES

The LEGUME-AID package is appreciably larger than others in size and contains more of the bacteria-carrying humus. This extra amount of inoculant makes it easier to treat your seeds more thoroughly at planting time.

LEGUME-AID

Whether planting clover, alfalfa, lespedeza, peas, beans, lupines or any other legume, it pays to assure maximum nitrogen fixing power by treating seeds with the famous "Inoculant in the Carton." LEGUME-AID is neither sticky nor gummy. It pours freely, clings to seeds closely, yet never clogs the drill. Ask your seed dealer, or write us direct.

AGRI-LAB, INC

AGRICULTURAL LABORATORIES, Inc.
1310 Chesapeake Avenue Columbus 16, Ohio

FARM AND HOME "HANDY PUMP"

An all 'round ¾" pump for farm and home utility use. Weighs only 20 pounds—self-priming. Fits pipe or garden hose. 8 GPM at 40 lbs. pressure (more at lower pressures). Lifts up to 25 ft. Electric. Complete. Guaranteed.

HANDY

Gorman-Rupp Pumps are made in all sizes from the Handy and Midget up to irrigation pumps delivering 1000 GPM at 100 lbs. pressure.

The MIDGET 1½" pump—weight 62 pounds. Pumps 5500 GPH . . . Self-primes to 30 feet . . . non-clogging . . . trouble-free.

MIDGET

Send your name on a postcard for complete literature.

GORMAN RUPP PUMPS
THE GORMAN-RUPP CO.
MANSFIELD, OHIO

"BEEKEEPER"

For full success and enjoyment in beekeeping, subscribe to the world's most popular bee magazine, "Gleanings in Bee Culture," published by the world's leading manufacturer of beekeepers' supplies, The A. I. Root Company. Gleanings is a monthly publication and the subscription rates are one year—$2.00, two years—$3.00 and three years—$4.00. Sample copies sent upon request.

GLEANINGS IN BEE CULTURE
Dept. 31 Medina, Ohio

IT'S THE CARCASS THAT COUNTS

Landrace inbreds crossed on your sows get more Vigor and Leaner Carcasses. Hamprace, Poland-Landrace and Large English-Black-Landrace inbreds available for pure lines or crossing.

HAMPRACE SWINE BREEDER'S ASS'N.
W. H. Yaw — Sec'y
Box 481 West Lafayette, Indiana

the truth about *hardfacing!*

Although agricultural hard-facing of ALL types of farm implements has been common practice for many years, there are still some farmers unacquainted with the process. Its primary purpose is to reduce wear, but other benefits follow. For example . . .

BETTER EFFICIENCY—Hard-facing maintains size and shape of plow points —hence keeps plows operating acre after acre without attention.

LESS SHARPENING—Proper hard-facing produces a self-sharpening action which cuts maintenance costs. Sharp tools pull easier too.

FEWER REPLACEMENTS—Less wear means longer life. Because hard-faced implements last 5 to 30 times longer you require fewer spares.

SAVES TIME—Fewer changes in the field get more work done.

SAVES MONEY—Less reforging and sharpening cuts operating costs.

INDEFINITE IMPLEMENT LIFE—By re-applying TUBE STOODITE as it wears away, life is extended almost indefinitely.

Now, when steel shortages again threaten implement supplies, start using TUBE STOODITE to protect against wear! Your local blacksmith or job welder will help you. Or you can do your own hard-facing with standard oxy-acetylene welding equipment. Stoody Alloys are available from 600 dealers in the United States and Canada.

STOODY COMPANY

11975 EAST SLAUSON AVENUE, WHITTIER, CALIFORNIA

PLOW SHARE properly hard-faced on point and along under edge. TUBE STOODITE is easy to apply, makes smooth, thin deposits.

LISTER SHARES retain sharpness 25 to 30 times longer when hard-faced. Application can be repeated with similar results.

ENSILAGE KNIVES stay sharp 30 to 40 times longer after hard-facing.

MILL HAMMERS from same machine after same use. NOTE hard-faced hammer (right) still retains square corners with full efficiency.

WANT TO KNOW MORE ABOUT STOODY HARD-FACING?

STOODY COMPANY,
11975 East Slauson Avenue, Whittier, California

Please send me without cost a copy of the STOODY FARM HARD-FACING MANUAL.

Please check:

I do my own welding with GAS ☐ ARC ☐
I use Crawler Type Tractors. Yes ☐ No ☐

NAME_____

ADDRESS_____

CITY_____ STATE_____

ENDS LABOR PROBLEMS . . .

Proven for
Almonds
Walnuts
Pecans
Tung Nuts

New uses discovered every day! Amazing 1-man machine that picks up nuts from ground . . . tosses out dirt, sticks, leaves . . . dumps clean crop into sacks or wagon. Write for full details. FREE TEST on your crop.

MAIL COUPON TODAY!

A. D. Goodwin & Son
Manteca, California
Please send me complete information on the Goodwin Nut Harvester.
Name .....
Street .....
City ..... State .....

"Moneymaker," one of our prize herdsires.

No More Waiting!

SELECT NORRIS BRAHMAN SERVICE AGE BULLS . . .

AVAILABLE IMMEDIATELY

Now you can get the bull you need for profit-making crossbreeding for bigger beef from our large selection of service age purebred Brahman bulls. Prices range from Woolworth to Tiffany, but mass production methods make *all* prices unusually low for the quality offered. Write for full information on how Brahmans in your herd increase dressing percentages, improve health, save feed and bring higher market prices. Ask for Packet "J".

NORRIS CATTLE COMPANY
R. G. "Bob" Herrmann, Gen. Mgr.
Box 1051 **Ocala, Florida**

dairy barn and is presided over by a grave young teacher whose chief problem is to keep her pupils from dismantling the farm machinery which is stored in a shed adjoining the playground. There is a small chapel for routine devotions, a pelota court, and small kitchen gardens.

JOSE ALONSO LAS-HERAS, manager of Serdon Farm, and Jose Gamazo, who manages the labor force on the farm.

The 200-odd souls in the village regard themselves as fortunate for, by local standards, the owners exercise a benevolent and fatherly concern for their welfare. From Sr. Alonso comes a fat lamb on feast days, bonuses when the crops are good or the laborer has been worthy of his hire, and wine from the farm caves when there is a wedding to celebrate.

In addition to the 60 workers living on the farm, there are 60 more from the village a mile away who are regularly employed. When the beets are thinned and the potatoes dug an additional 50 women and 30 men are hired.

This force of 120 year 'round and 80 seasonal laborers sow, reap, and process a wide diversity of crops on the 1800 acres at Serdon, of which 750 are irrigated and 500 are in dry farming. The remaining 550 acres are marginal and upland where the sheep and cattle may graze for a few weeks in spring.

The big crop on the irrigated land is potatoes, 187 acres. Also irrigated are 150 acres of grapes, and smaller acreage of beans, barley, fruit, corn, and garlic. The corn is grown exclusively for silage, Serdon having one of the few silos in these parts, an ornate structure built of concrete. It takes a week to fill it by hand.

Of the 500 acres in dry farming, 225 are in wheat and the remainder in barley, beans and Spanish peas. From its vineyards Serdon makes and sells each year 55,000 gallons of wine. In addition thousands of gallons go to the workers as payment in kind.

Serdon is the best mechanized farm in the Valladolid region. There are three tractors, two John Deeres and one Farmall Cub, three reapers and an array of drills, plows, harrows, etc., all old and in bad repair owing to lack of parts. Since the Civil

ROTO-PAK

Packs and Distributes Silage Automatically

Now you can save the labor of distributing silage by hand, prevent spoilage, and add up to 20% to your capacity. Roto-Pak can be used with any type of blower, takes only a few minutes to install on any type or size of silo, roofed or unroofed. Operation is completely automatic. Hundreds of enthusiastic users. Write for details today!

AEROVENT FAN & EQUIPMENT, INC.
P. O. BOX 28 DEPT. B LANSING, MICH.

Farm Management For 36 Years

Management and Services to Farm Owners Include:

Surveys	Reorganization
Budgets	Appraisals
Advisory	Accounting

Complete Management
Farm Income Tax Returns
Purebred Livestock on Commission

Burlingame, Field, Pierce & Browne, Inc.

45 West 45th Street, New York 19, N. Y., Luxemburg 2-1948
158 Main Street, Putnam, Connecticut, Putnam 8-6866

Write or telephone for details.

BEAUTIFY YOUR FARM OR ESTATE WITH ORNAMENTAL BIRDS

For almost a half century, we have been supplying Swans, Wild Ducks, Wild Geese, Peafowl, Cranes, Pheasants, and other beautiful and exotic birds throughout the world. Write for latest prices.

Mackensen Bird Farm
Yardley, Pa.

Breeders Importers, Exporters of birds since 1904

DON'T LET RUSTY WATER RUIN WASHDAY!
SEND FOR THIS BOOKLET
This booklet shows how you can have crystal-clear, palatable water in your home. Diamond Iron Removal Filters take out all iron and other foreign matter. Costs little — worth a lot.
Oshkosh Filter & Softener Co.
Oshkosh, Wisconsin

War all parts have been made by hand.

There are 14 horses, 6 mules and 6 spans of work cattle. A herd of 800 Karakul sheep is about breaking even, but they hope by upbreeding to raise the percentage of saleable pelts to take the experiment out of the red. A dairy herd of 24 Black and White milk cows loses money every year. The cows are kept solely for the manure they produce. No one cared to estimate the number of chickens, dogs, cats and rats which are everywhere underfoot.

Regular laborers are paid the equivalent of 12,000 to 14,000 pesetas a year, 75 per cent of which is paid in money, 25 percent in wine, potatoes, wheat, etc. The farm grossed 5,000,000 pesetas in 1950, or $100 for every cultivated acre. Of this, 1,750,000 pesetas went for labor, and 210,000 pesetas for income and land taxes, which are low on irrigated land developed less than ten years.

Serdon has problems. All machinery is wearing out and not only is new machinery very expensive but permits to buy are very difficult to obtain. Fertilizer is badly needed and only an extra drive for manure is keeping up fertility. Recently Sr. Alonso contracted for the manure from the cavalry barracks at Valladolid at 1 peseta per horse per day, a sky-high price in Spain.

The big problem of Serdon is to keep the boys down on the farm. Families with teenagers want to move into the village where there is a movie, a big pelota court and dance hall. The men, too, are strangely interested in a new casino which recently opened.

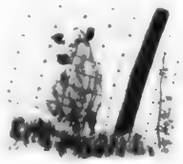
Of Bulls and Franco

Spain, to most Americans, is a country in Europe where there is an impressive monument to the Moors, the Alhambra, a country where everybody attends bullfights because they like cruelty, and where now there is a dictator named Franco. Most of our understanding of the Spanish people was gleaned from a few brief chapters in our history books, which tell us of the discovery of America by Columbus and the conquest of Cortes, Pizarro and Coronado.

More recently we had the confused reports of American newspapers at the time of the Spanish-American War, and the Civil War and its complex tieups with Communism and Fascism.

Most Americans take a dim view of bull fighting. To them it is unnecessarily cruel.

The Farm Book Store



The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.

Livestock

Animal Sanitation and Disease Control—*by R. R. Dykstra* $3.50
How to recognize and prevent the spread of animal diseases.

Feeds and Feeding (21st ed.)—*by F. B. Morrison* $7.00
The authoritative book on livestock and poultry feeding.

Dairy Science (2nd ed.)—*by W. E. Petersen* $5.50
A new edition of one of the best and most complete books on dairying.

Sheep Science—*by W. G. Kammlade* $5.50
The breeds, care and feeding of sheep for wool and mutton production.

Beef Cattle—*by Roscoe R. Snapp* $5.50
A carefully revised edition of this excellent book on beef production.

Poultry Handbook—*by Rudolph Seiden* $4.95
An alphabetical reference book of poultry information.

Successful Poultry Management—*by M. A. Jull* $5.00
The second edition of this practical book on poultry.

Pork Production—*by William W. Smith* $5.00
The standard text on the breeding, raising and marketing of hogs.

Farm Management

Servicing & Maintaining Farm Tractors—*by Johnson & Hollenberg* $4.00
A book that will help you make your tractor last.

Making the Most of Your Food Freezer—*by M. Essipoff* $3.00
The care and feeding of a deep freezer.

How To Make Your Farm Pay—*by Carl C. Malone* $2.50
Farm management as specifically applied to the corn belt.

Out of the Earth—*by Louis Bromfield* $4.00
Bromfield writes of farming for the farmer.

Modern Farm Management—*by Andrew Boss & G. A. Pond* $5.00
The principles and application of management to the farm.

Farm Work Simplification—*by L. M. Vaughn & L. S. Hardin* $2.80
The application of efficiency studies to farm work.

Success on the Small Farm—*by Haydn S. Pearson* $3.50
Subject—how to net $3,000 a year on 10 to 12 acres.

The Farmer's Handbook—*by John M. White* $4.95
Easy reference book on crops, livestock, and farm problems.

Front Porch Farmer—*by Channing Cope* $3.00
Year round grazing in the south, the easy way to farm.

Law on the Farm—*by H. W. Hannah* $4.95
An excellent reference on the law as it applies to farmers.

Farm Quarterly (Bound Volume) $8.00
All issues of 1950 handsomely bound in buckram for easy reference.

Soil and Crops

The Complete Guide To Soilless Gardening—*by Wm. Gericke* $3.75
The father of Hydroponics tells how to grow plants in water.

Elements of Soil Conservation—*by H. H. Bennett* $3.20
Hugh Bennett tells you how to avoid soil erosion.

Colorstrip Plant Testkit $4.00
A compact, accurate tissue testing kit that can be carried in the pocket. Tells whether your crops are getting enough nitrogen, potassium and phosphorus to make good growth and produce high yields. Complete instructions come with the kit.

Forage and Pasture Crops—*by W. A. Wheeler* $8.00
A guide to the growing of all forage and pasture crops.

Forage Crops—*by Gilbert H. Ahlgren* $5.50
A book that emphasizes the production of hay and silage.

Pastures—*by Lancaster, James, Bailey, and Harris* $3.40
Southern pastures and how to achieve year 'round grazing.

Soils and Fertilizers—*by Firman E. Bear* $4.00
An understandable book on the complex subject of fertility.

Using and Managing Soils—*by A. F. Gustafson* $3.00
Fertility, rotation, drainage, erosion, tillage are covered.

Hunger Signs In Crops—*A Symposium* $4.50
How to diagnose fertility needs from the plants themselves.

Production of Field Crops—*by Hutcheson, Wolf & Kipps* $5.00
A new edition makes this the latest work on American field crops.

Irrigated Soils—*by Thorne and Peterson* $5.00
The practice of irrigation and the management of irrigated soils.

THE FARM BOOK STORE J
c/o The Farm Quarterly
22 E. 12th St.
Cincinnati 10, Ohio

I enclose (check, money order or cash) for the following books. Please send them to me immediately.

(Title of book) (Price)

(Title of book) (Price)

(Title of book) (Price)

Name_____

Address_____

City_____ State_____

THE BOOKS WILL BE SENT TO YOU POSTPAID.
Buyers living in Ohio should add 3% to price for sales tax.

Look for this name... BOYT

it's a mark of distinction on:

RIDING EQUIPMENT

Riding equipment for farm use, pleasure and show. English and Western saddles, bits, bridles, spurs. Stable blankets. Girths. Caveson sets. Other horse equipment.

SHOW HALTERS

Baby beef, cow, calf or bull show halters. Complete selection. Cow blankets in all sizes.

OTHER BOYT ITEMS

Today, as for the past 50 years, Boyt is still making the strongest work harness in America. Also available are horse collars, body belts, tarpaulins, hunting and fishing equipment, and many other items of particular interest to the farmer and sportsman.

FREE CATALOG — Leading harness, hardware and implement dealers feature Boyt items. For free catalog, write The Boyt Co., Dept. L, Des Moines, Iowa.

BOYT CRAFTSMEN IN LEATHER AND CANVAS WHERE STRENGTH IS REQUIRED

There's always a job . . .

For

CHOREMASTER

the ONE WHEEL GARDEN TRACTOR as low as $151.50

Freight Extra

CULTIVATING

WEED CUTTING

SNOW PLOWING

GRASS MOWING

CHOREMASTER lightens and speeds farm, lawn and garden tasks. 2 or 3 H.P. Engine.

This between-the-row Tractor safely cultivates high growing crops . . . turns easily at row ends. Add low-cost attachments for cultivating, weed and grass cutting, spraying, hauling, snow plowing, and other tasks. Write for literature and name of dealer.

CHOREMASTER DIV.

THE LODGE & SHIPLEY CO.
806 Evans St., Cincinnati 4, O.

The Spaniard who is confronted with this view usually asks about the blood and gore of an American prize fight. "Better a bull bleed than a man," they say. But the average Spaniard can take his bull fights or leave them, much the same as the average American can take wrestling or the horse races and be quite happy without them. The bull fight arena in Madrid seats 25,000, the football stadium, 80,000, which is a measure of the popularity of the two sports.

Out in the villages the farm boys kick a cheap football around the vacant lots, much the same as American boys play sandlot baseball. And both dream of being the Babe Ruth of their country. The heroes of the nation, the top matadors of Seville and Madrid, started in the Spanish bush leagues, the village arenas, worrying fourth class bulls on hot Sunday afternoons.

The Spaniard will tell you that he sees only the art and ceremony of a bull fight, an art and ceremony as meticulous as ballet dancing and as formalized as a religious ceremony. However philosophical the spectators might be, from the bull's viewpoint his last hour is one of sublime agony. If the American sees this, and not the incomparable skill and grace of the swordsman, then he is advised to stay away from bull fights, as the bulk of the Spanish do. Those who do attend must have that thin streak of cruelty which the Spaniards themselves confess they have.

The Farmer Eyes the Government

To the Spanish farmer his government is sometimes good, sometimes bungling, sometimes bad; and he says so in no uncertain terms and without noticeable fear of the police. In his attitude toward his government he gripes just like an American farmer, and for much the same reasons. He has red tape too, quotas, and price ceilings. But most Spaniards regard General Franco as a liberator who brought peace and delivered them from the Communists. This does not prevent an open and free criticism of his management of government. "He is sometimes ill advised," they say. Or, "He knows nothing about economics," or, "He doesn't put first things first." But few resent the Madrid police who carry tommy guns, because everyone remembers the Civil War, and how overnight neighbor rose against neighbor, and every village had its bloodletting; and they want no more of it. In the rural districts the Civil Guards with the patent leather hats on backward maintain law and order and are no more feared by law-abiding men than the sheriff of an American county.

Since the end of the Civil War in 1939, the dictatorship of General Franco has softened. The people elect a portion of the members of the Cortes, which proposes and formulates laws, and is an advisory body—Franco keeps the veto power.

Freedom of speech and freedom from secret arrest and imprisonment without

For Farm Buildings . . . Lightning never has destroyed any building fully protected by Security System. It protects against new dangers from water piping, air ducts, etc. New low points, almost invisible. Most durable materials, all UL approved.

For Electrical Appliances Unlike ordinary arresters, Green Guard holds lightning surges to *less* than line voltage. Prevents damage to ranges, water heaters, motors, switches. Send for full story. Security Mfg. & Contracting Co., Burlington 5, Wis.

2-WAY LIGHTNING PROTECTION

SECURITY LIGHTNING PROTECTION IN THE MODERN MANNER

"WORK HORSE" WORKBENCH

Deluxe, ruggedly built of hard maple; top is 13⅜" lam nated maple. Has 2 wood vises, 10" jaws, opening to 8½". 12 pegs permit clamping work up to 48" wide. (Vises alone worth over $20.) Two models: 42"x21½"x31" high; and 60"x21½"x33" high. All mortise and tenon joints easily assembled with only a hammer.

WORK HORSE WORK BENCH

Large size $69.50; other $47.50 f.o.b. Fairport. Shipped knocked down.

Write for circular, or send check or money order to —

The TRESCOTT CO., Inc.
1 Railroad Street
Fairport, N.Y.

AMERICAN-LINCOLN

Model 2400

The All-Purpose Incubator of Champions!

Whether it's hen eggs, game birds, ducklings or poults, the AMERICAN-LINCOLN Incubator has been first with breeders of champions. Agricultural colleges, Experimental Stations and other institutions of poultry learning also rely on its consistent performance.

• Write for catalog of the American-Lincoln "Three-In-One" Incubators. There's a size to suit every need from 85 to 5,000 eggs.

AMERICAN-LINCOLN INCUBATOR CO.
Dept. AH, 645 Somerset Street, New Brunswick, N. J.

Your Family Deserves THE FINEST

SAFGARD

Home Milk and Cream
PASTEURIZER

is the *only* home pasteurizer with MOTOR-DRIVEN AGITATOR and ALL-OVER WATER BATH HEATING and COOLING for complete bacteria kill and better flavor. Features required in commercial pasteurizers. Be sure you get the finest! Your family's health depends on it!

Write for FREE folder on prevention of milk-borne diseases and details of 10 Day TRIAL OFFER!

Ask your dealer for a SAFGARD!
Safgard Division
Grand Sheet Metal Products Co.
2503 W. 24th St., Chicago 8, Ill.

BEEF CALVES FROM COWS YOU CAN MILK!

Dams of these Red Poll steers were *on the milk line* when the photo was taken. As calves they nursed two, sometimes three, to a cow. They made profitable gains—good to choice carcasses. Ask for information on the versatile, all-red, naturally hornless, dual purpose Red Poll.

Booklet And Breeders Directory Free. Subscribe RED POLL NEWS $1 per yr.; $2.50 for 3 yrs.

RED POLL CATTLE CLUB OF AMERICA
3275-Q Holdrege St. Lincoln 3, Nebr.

trial are facts of everyday life. Censorship of the press galls the Spaniards, who nevertheless see humor in the display of uncensored American newspapers side by side with Spanish on the same newsstand. The Catholic religion is the official religion. Other faiths may exist, but worship is restricted and hampered and there is a great weight of official and private pressure against Protestants and Jews.

Under the dictatorship of General Franco a poor country, five times the size of Ohio, with a growing population of 28,000,000, has made a remarkable recovery with no help. Half the population is rural. The country is in the midst of an inflation, which, if not galloping, is going ahead at a fast trot. Recently prices have gone up three and four times as fast as wages. While strikes are forbidden, demonstrations are frequent and in some places, such as Barcelona, have reached the proportions of riots.

The gulf between the very rich and the very poor is wide indeed, wider perhaps than in any other European country. There is, however, chicanery in high government circles, on which Spain has no monopoly, including the Spanish equivalent of the mink coat.

The government seeks to keep the price of food from spiraling with the inflation which is gripping the nation and it seeks to maintain an equitable distribution. Bread, olive oil, sugar, coffee, and gasoline are rationed and the price is fixed. And why the Spanish should ration their coffee is a mystery to foreigners, for it is universally agreed that it tastes like something one buys at a drug store for an upset stomach. The prices of fish and meat are fixed but they are not rationed.

Free at the moment are beans, wine, potatoes, milk, butter, cheese, and eggs. Eggs are scarce and high and it puzzles the Spanish why their government has always regarded them as luxuries and not necessities. Sausage and other meat by-products are free also. The trend is toward more rationing. The black market is on a rampage and prevents any great efficiency in rationing.

Help from the State

The Spanish farmer has no elaborate system of state and federal aid such as the American farmer has. There is no county agent at his call, no network of experiment stations to develop new crops and methods. The government does maintain, at each provincial capital, a corps of agricultural engineers and the few experiment stations are excellent. The engineers are highly capable men, well versed in agricultural science, but they are spread thinly and their skills reach few farmers. As capital is available the government is building dams and increasing irrigated areas. Large estates are being purchased and broken up into small farms under the administration of the *Instituto Nacional de Colonizacion.*

The problem of bettering the lot of the

Get COMPLETE Cultivation

with the SPEED and VERSATILITY

of the HOE-ALL ALLIED Rotary Hoe

This Wheel

has ten scientifically formed angle teeth of tough abrasion - and - corrosion-resistant steel, riveted to the disc and welded to the hub. Impact and thrust are transmitted directly to hub and shaft.

IT HOES! IT CULTIVATES! IT WEEDS!
Extra-Strong! Works Fast! Saves Time!

There's nothing quite like the new Allied Rotary Hoe for perfect soil conditioning. It simplifies and speeds up early cultivating and weeding; it destroys weeds—turns up roots for the sun to kill; it uproots stubble. The Allied Rotary Hoe increases crop yields and multiplies farm profits. It's so *very* versatile! You can break, pulverize and loosen surface crust; you can maintain proper tillage conditions and thoroughly cultivate *all* soil around plants while you prepare an ideal surface mulch and leave an absorbent seed bed. Allied Rotary Hoes are available in 2, 3, 4 and 6 pull-type units as well as in the hydraulic lift type. Write for literature. ALLIED WHEEL PRODUCTS, INC., ANSONIA, OHIO.

GOOD DEALER TERRITORIES OPEN • WRITE FOR DETAILS

SHUR-RANE PIONEERED OVERHEAD IRRIGATION

20 YEARS EXPERIENCE SHOWS THESE FEATURES NEEDED FOR LEAST *TIME, EFFORT, EXPENSE*

1. Easy-working Couplers and lightweight, sturdy aluminum pipe that can be handled by one man.
2. Couplings that seal tightly under pressure, but which automatically drain water from line when pump is stopped.
3. Lines that can be disconnected from the center so that it is not necessary to walk to the Coupling and unhook a gadget before uncoupling pipes.
4. Coupler gaskets protected from damage at all times even when lines are connected.
5. Automatically locking Couplers with 17 degrees flexibility.
6. A patented Foot to keep Sprinklers and Couplings straight without need of guy wires or tripods.
7. Virtually unbreakable Couplings due to construction and patented alloy used.
8. Self-flushing dead ends on all lines to keep pipe free from dirt and grass.
9. One end of Coupling that is attached semi-permanently to pipe so that Coupling cannot fall off when lines are being moved.
10. All elbows, dead ends, and fittings designed to prevent cocking.

BE SURE WITH SHUR-RANE ★ ONLY SHUR-RANE HAS THEM ALL

SEND COUPON FOR NAME OF NEAREST DEALER

SHUR-RANE
IRRIGATION SYSTEMS
A PRODUCT OF
FOOD MACHINERY AND CHEMICAL CORPORATION
P. O. BOX 145, SAN JOSE, CALIFORNIA

SHUR-RANE IRRIGATION SYSTEMS, DEPT. FA
P. O. Box 145, San Jose, California
GENTLEMEN: Please send me complete information on *Shur-Rane* Irrigation Systems and the name of my nearest dealer.
NAME_____
ADDRESS_____
CITY_____ STATE_____

from Start to "Finish"

the world's largest pure-bred turkey breeding farm uses

Blue Ribbon Special

FORTIFIED CONDENSED BUTTERMILK

for healthier, heavier more profitable turkeys

MR. P. BROWNING, Pres. BROWNING TURKEY FARM

On all five Browning Turkey Farms in Winchester, Ky., Broad Breasted Bronze Turkeys are fed a planned diet of Blue Ribbon Special. Feeding of Blue Ribbon starts in the brooder stage and continues for 5 months. Fall finds the pure-bred back on Blue Ribbon getting a quick and profitable finish for market.

THIS PROOF OF PERFORMANCE MEANS PROFIT FOR TURKEY, DUCK, PIG AND POULTRY BREEDERS

Rely on Blue Ribbon to give your stock the vitamins and minerals needed for healthy, profitable growth. 3 types available. Fortified Pig Buttermilk with vitamins D&G. Fortified Chick Buttermilk with vitamins D&G and Blue Ribbon Special for general feeding.

write for PRICES

Blue Ribbon Special

for pigs, poultry, turkeys, ducks

THE MERCHANTS CREAMERY CO.

536 Livingston St. Cincinnati 14, Ohio

BLUE RIBBON SPECIAL and CONDENSED WHEY

SAVE MAN HOURS

Kutter-Kolter

New Model B

GET CLEANER, FASTER PLOWING with

LANTZ 2-BLADED COULTERS

Reg. U. S. Pat. Off.

● Only Lantz makes double-blade coulters. They cut and cover more trash than any single-blade coulter. Saves stopping to clear a clogged plow and you can plow faster. Helps fight corn borer. Every Lantz Coulter has four Timken Bearings and two Neoprene grease seals.

LANTZ KUTTER-KOLTER, the original 2-blade coulter, has proved its ability for over 13 years . . . in plowing contests and on thousands of farms. Uses 16", 17" and 18" blades.

THE NEW LANTZ MODEL B COULTER has several new engineering features. It's lighter, but stronger; more easily installed and has greater adaptability to plows with limited clearance. Uses 16" and 17" blades. Exclusive . . . Cross-Over Scissor-Action.

Cross-Over Scissor-Action

Write for Literature and Name of Nearest Dealer

We also manufacture the Lantz Original Flexible-Grapple Hay Fork, Lantz Sickle Grinders and Lantz Tire Traction Clamps.

LANTZ MFG. CO., INC.

Dept. 53 • Valparaiso, Indiana

Spanish farmer is complex. If he is to get more for his crops the workers in the cities will have to get more wages from industry which is still recovering from the war. Fertilizer would help, especially nitrogen. The economic unit is, however, too small for any great advantage from more mechanization. Why buy an expensive tractor, they ask, when a team of mules will do the work? Farmers could use heavy machinery occasionally. This might be maintained in pools by the government, but a tractor on every Spanish farm would be impractical. There are 9,000 tractors in all of Spain. Many are useless and are kept by the owners for no other purpose than to draw a gasoline ration, which is promptly sold on the black market. The development of grasses for the semi-arid areas has been slow. A Montana or Wyoming farmer would say that the great central plateau could grow many times more hay and grass if some of the new dry-season grasses recently developed in our West were put to work.

Even at its best, dry farming in Spain is not highly productive. Farmers speak of the yield as "five to one," and "eight to one," that is, five or eight seeds harvested for one planted. This adds up to only a few bushels per acre. Since the Civil War (1936) fertilizer has been very scarce, and manure, principally sheep manure, must carry the burden.

One man with one team can farm 90 acres in the dry farming areas. If the team is extra good the acreage may be more. The condition of the team often determines the size of the farm and the income made from it. The price of mules, horses and work cattle is astronomical by Spanish standards. A good mule costs 20,000 to 25,000 pesetas, $500 to $625, two or three times the yearly wages of a farm laborer. Three mules will buy a tractor.

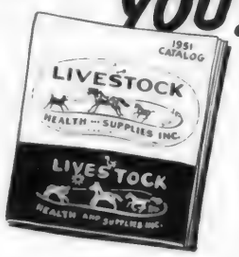
From Oranges to the Eternal Snows

The farms of Spain are as diversified as those of America. In the Pyrenees among the eternal snows and in the foothills of the north, goats and sheep pick, blade by blade, a scanty fare from the rocky slopes. In the rich soil around Barcelona big crops of vegetables and wheat go to feed the city's 1,500,000 population. From that small ribbon of coastal plain which faces the Mediterranean to the south come the oranges and lemons for half of western Europe, and big crops of rice, cotton, figs and dates. The rolling hills around Murcia, Jaen, and Granada are covered as far as the eye can see with olive trees. Up in the northwest corner of the country, along that strip of coast between Portugal and France, there is a rich farming and industrial region where farmers live properly in farmhouses and have many bicycles.

The olive and grape industries are run by two of the largest "syndicates," which regulate production, processing, and marketing. They are, in effect, government supervised cooperatives.

LOOK

THIS NEW, COMPLETE, FREE CATALOG NOW READY FOR YOU!



This is it! All your latest, proven livestock needs released by country's leading companies, now in one, compact catalog. Saves you time, money! What you want in Livestock Supplies and Remedies, Agricultural Chemicals, Insecticides—everything! Send for your copy today. Supply limited. Address to Dept. 7.

Free

LIVESTOCK HEALTH and SUPPLIES INC.
1093 W. HIGH ST., LEXINGTON, KY.:
Please rush me, without obligation, your 1951 complete Livestock Supply catalog.

NAME_____

ADDRESS_____

7

LIVESTOCK HEALTH and SUPPLIES INC.
1093 W. High St., Lexington, Ky.

ANGUS are a good SOUND INVESTMENT

● MODERN BEEF TYPE. Naturally-hornless Angus rate superior as economical beef producers. They mature quickly . . . convert feed efficiently . . . return a good profit.

● COMMAND PREMIUM PRICES. Packers pay more for Black steers because they dress out a premium carcass and a higher percentage of salable beef.

● LARGER CALF CROPS. Heifers and cows have less calving trouble for Angus calves have smaller polled-shaped heads. Gives you more calves to sell. For information, write

American Angus Ass'n, Chicago 9, Ill.

5-HP GRAVELY Tractor

Offers 20 Tools to Mechanize Your Time-Consuming Small Jobs!

You save time, work and money by using small equipment for those jobs ordinarily done by hand. Your big equipment is fine for the big field jobs, but how about the fence rows, lawns, small kitchen gardens? That's where you need a Gravely!

Rugged, *dependable* POWER at your finger-tips. Field-tested—30 years. Only the Gravely does so many jobs so well! "Power vs Drudgery" tells you how to put POWER to work on the small jobs! Write today!

GRAVELY MOTOR PLOW & CULTIVATOR CO.

BOX 932 DUNBAR, W. VA.

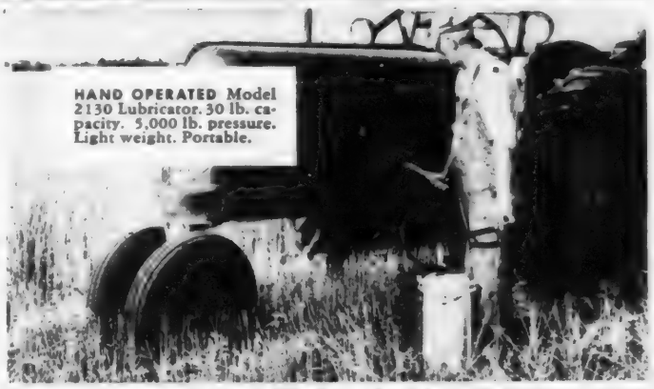
ADVERTISERS' INDEX • AUTUMN

	Page
Aeroil Products Co.	138
Aerovent Fan Co.	133, 138
Agricultural Laboratories	136
Albers Milling	Second Cover
Allied Mills, Inc.	9
Allied Wheel Products Co.	141
Allis Chalmers Co.	21
Aluminum Co. of America (Irrigation Pipe)	86
Aluminum Co. of America (Roofing)	91
American Aberdeen Angus	142
American Berkshire Assoc.	118
American Brahman Breeders	114
American Corriedale Assoc.	124
American Crop Drying	130, 132
American Guernsey Cattle	122
American Hampshire Sheep	134
American Lincoln Incubator Co.	140
American Milking Shorthorn	134
American Shorthorn Breeders	109
American Society of Farm Mgrs. & Rural Appraisers	134
American Steel & Wire Co. Columbia Steel Company, Tennessee Coal, Iron & Railroad Co., U.S. Steel Export Co.	113
Anchor Serum of Indiana	130
Anchor Serum of Missouri	102
Ariens Company	136
Aro Equipment Co.	143
C. S. Bell Co.	136
Bennett's Dalmatian Dog Farm	134
Bostrom-Brady Mfg. Co.	120
N. P. Bowsher Co.	132
The Boyt Company	140
Bready Tractor	123
Brillion Iron Works, Inc.	102
Brown-Forman Dist. Corp.	20
Buckner Mfg. Co.	114
Burlingame, Field Pierce & Brown, Inc.	138
Butler Mfg. Co.	14
Campbell Hausfeld Co.	128, 126
J. I. Case Co.	99
Chore-Boy Milking Machine	122
Clay Equipment Corp.	83
Cobb's Pedigreed Chicks, Inc.	120
Cobey Corporation	133
Cochran Farm	124
Comfort Equipment Co.	98
Conner Prairie	134
Fremont John Conrad	102
Consolidated Products Co.	18
Country Book Store	132
Danuser Machine Co.	102
Deere & Company	4
Deming Co.	117
DeLaval Separator Co.	15
Doane Agricultural Chemical Company	117
Dow Chemical Co.	16
Early & Daniel Co.	118
Eaton Mfg. Co. (Eaton-Axle)	13
Edwards Laboratory	126
Electric Auto-Lite (Spark-Plugs)	106
Electric Auto-Lite (Batteries)	10
Ezee Flow Corporation	110
Farm Tools, Inc.	129
Harry Ferguson Co. Inc.	11
Firestone Tire & Rubber Co.	3
Flint & Walling Mfg. Co.	120
Fox River Tractor	100
Fuerst Bros. & Co., Ltd.	96
Gehl Bros. Mfg. Co.	104
General Mills	97
Golden Arrow Farm	126
The B. F. Goodrich Co.	81
A. D. Goodwin & Sons	138
Gormann-Rupp Co.	127, 136
Gravely Motor Plow Co.	142
Grazing Fields—Bay End	134
Great Lakes Steel Corp.	116
Habco Mfg. Company	126
Hamprace Swine Breeder's Assoc.	136
Hawley Mfg. Co.	87
Hercules Steel Products	131
Dr. Hess & Clark Inc.	98, 111
Hotchkiss Steel Products	124
Hubbard Farms	108
H. D. Hudson Mfg. Co.	2
International Harvester Co.	1
Iroquois Farm	118
Jacuzzi Bros.	128
Forrest Keeling Nursery	124
Kuder Pulp Sales Co.	84
LML Engineering & Mfg. Corp.	130
Lantz Mfg. Co., Inc	142
Leach Mfg. Co.	98
Libby-Owens-Ford Glass Co.	85
Lincoln Hotel	118
Livestock Health & Supplies, Inc.	142
Lodge & Shipley Co. (Choremaster Division)	140
Lord & Burnham Co.	118
Louden Machinery Co.	88
Mackensen Bird Farm	138
Macmillan Co.	114
Marlow Pumps	111
Martin Steel Corp.	Third Cover
Massey Harris Co.	89
Merchants Creamery	142
Minneapolis Moline	Back Cover
Morton Salt Co.	17
Moulton Irrigation Co.	112
Musser Forrests, Inc.	132
F. E. Myers & Bro. Co.	132
National Band & Tag Co.	130
National Soil Conservation	92
National Turkey Inst.	98
New Holland Machine Co.	135
New Idea, Inc.	19
Nichols Poultry Farm	126
Nitgrain Co.	130
Norris Cattle Co.	138
Nutritional Research Co.	132
Oliver Corporation	115
D. W. Onan & Sons, Inc.	128
Opekasit, Inc.	120
Oshkosh Filter & Softener	138
Ottawa Mfg. Co.	120, 134
Papec Machine Co.	82
J. Parks & Sons	130
Peirson-Moore Co., Inc.	113
Perfect Circle Corp.	8
Pioneer Hi-Bred Corn Co.	6
Proto Tools Co.	80
Rainbird Sprinkler Mfg. Corp.	123
Ralston Purina Co.	103, 121
Red Poll Cattle Club of America	140
Reynolds Metals Co. (Alumi-Drome)	107
Rilco Laminated Products	112
Roto-Hoe & Sprayer Co.	90
Roto-Tiller Corp.	144
A. I. Root Co.	136
Rusticraft Fence Co.	127
Safe-Guard Div.	140
St. Paul Hydraulic Hoist Div.	96
Scott's Farm Seed Co.	120
Jos. E. Seagram Co.	7
Seaman Motors	125
Security Mfg. & Contracting	140
Shorthorn World	128
Shur-Rane Corp.	141
Skinner Irrigation Co.	132
Smith Agricultural Chemical Co.	129
A. O. Smith Corp.	108
South Michigan Nursery	133
Spohn Medical Co.	120
E. R. Squibb & Co.	105
Stone Mountain Grit Co.	12
Stoody Co.	137
Sudbury Laboratories	95
Tennessee Corp.	109
Tokheim Oil Tank & Pump Co.	93
Trescott Co.	140
U.S. Industrial Chemical	94, 119
Universal Mfg. Co.	134
Vitamineral Products Co.	128
Jos. A. Vogel Co.	90
E. M. Wade	130
Willoughbys, Inc.	86
Wisconsin Motor Corp.	104
Woodbine Farms	124
Wood Products Co.	131
Wyeth, Inc.	101
Yardley Plastic Co.	96

Farm Quarterly, 22 East 12th St., Cincinnati 10, Ohio

Advertising Offices: NEW YORK CITY, Edward Wagner, 251 4th Avenue. CHICAGO, B. A. Rosentha!, 333 North Michigan Blvd. DETROIT, Hil Best, Transportation Bldg., Wo 2-7293. KANSAS CITY, W. M. Temple, 15 West 10th St. OHIO & INDIANA, Harry Dunnohew, 22 East 12th St., Cincinnati, Ohio. Publisher: Automobile Digest Publishing Corp., Aron M. Mathieu, Vice President; H. C. Dunnohew, Advertising Manager; Frederic B. Knoop, Circulation Manager. Member A.B.C.

ARO FARM LUBRICATORS
SAFEGUARD MACHINERY SAVE MAINTENANCE EXPENSE
FAST...CLEAN...EASY TO USE! You save 3 ways—with modern ARO Farm Lubricators to keep tractors and implements lubricated right! Save down-time—fewer breakdowns ... less lay-off time. Save labor—Aro guns, fillers and adapters are speedy and handy for use anywhere. Save money—less maintenance. Ask your farm implement dealer about the complete ARO line including hand-operated and air-powered Farm Lubricators and ARO Grease Fittings. Rugged ... efficient ... dependable. The Aro Equipment Corporation, Bryan, Ohio.
PORTABLE—NO HOSE! Aro Model 2647 includes Heavy Duty Grease Gun and Portable Filler. Gun loaded directly from filler. 10,000 lb. pressure. Ideal for hard-to-reach fittings.



AIR POWERED Model 2160 Lubricator. 60 lb. capacity. Light or heavy grease. Easy access to hard-to-reach fittings. Portable. Saves time.
SAVE Time, Labor Maintenance with ARO
FARM LUBRICATORS

FREE ILLUSTRATED BOOK

SHOWING LATEST DEVELOPMENTS IN

Power Gardening

Read Ed Robinson's Fascinating Story of the ROTO-ETTE* and How It is Revolutionizing Country Living in America Today!

IF YOU live in the country or suburbs, you owe it to yourself to know everything possible about the newest application of power to perform many strenuous, often back-breaking, chores. Here, in the compact, easily operated ROTO-ETTE is the outstanding example of a machine that can perform time-saving miracles in yards and gardens everywhere!

The ROTO-ETTE is an all-around, automatic handyman that enables you to do a day's work in an hour! It will not only completely prepare the seedbed for planting in a single operation. It will also do your composting—right in your garden itself. By mixing weeds, cover crops, even cornstalks into your soil, it practically ends the need to buy expensive manures, topsoil, peat moss.

Picture above shows the revolutionary, new Roto-Miller (Pat. Pending) which enables you to compost by machine right in your garden itself! The Roto-Miller makes possible the use of all kinds of organic waste as fertilizer—builds rich, new topsoil.

People Call It Greatest Advance in Country Living Since the Model T Ford

The ROTO-ETTE is basically an efficient, inexpensive machine applying the new science of rotary tillage to modern gardening needs. But, by using easily-switched attachments, it can be converted into time and work savers in dozens of other ways. In a few minutes it can be converted into a power lawn mower, power field scythe, power snowplow, power grader, water pumper, power sprayer, power saw, etc. Every month in the year, Winter or Summer, you will find its amazing handyman performance indispensable.

Let the Author of the Famous "Have-More" Plan Tell You All About It

It is impossible, of course, to tell you all the wonderful things you should know about this newest boon to country living. So we asked Ed Robinson, author of the famous "Have-More" Plan and Roto-Ette owner, if he would write a book for us, explaining and picturing some of the many ways he uses the ROTO-ETTE, and what it can accomplish. It is a real eye-opener and can be worth many dollars to you. To get your copy FREE, simply mail the coupon at left, enclosing 10 cents to cover the cost of postage and handling. No obligation, of course. Simply address ROTO-TILLER, Inc., Dept. 99, Troy, New York.

ROTO-ETTE
Reg. U. S. Pat. Off.
* Roto-Ette and Rototiller are registered trademarks.

Rototiller, Incorporated
Dept. 99, Troy, New York

Please send me FREE, by return mail, a copy of Ed Robinson's 68-page Illustrated Book, POWER GARDENING and POWER COMPOSTING. I enclose 10 cents to cover cost of postage and handling.

NAME.....

ADDRESS.....

CITY.....

COUNTY..... STATE.....

FREE!

68-PAGE ILLUSTRATED BOOK

POWER GARDENING

Goodbye; plow disc, and harrow! Roto-Ette prepares ideal seedbed 5" to 7" deep in ONE operation and then cultivates, still **without changing anything!** Costs far less, does much more than ordinary, old-fashioned "garden tractors."

POWER LAWN MOWING

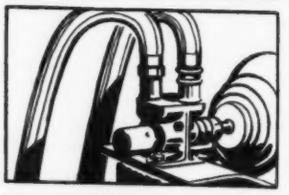
Cuts velvet-smooth 25" swath. Leaves no untrimmed edges. (No casters or overhanging wheels). Follows contour of ground perfectly. "Best power mower built," users say.

POWER SCYTHING

Nothing else like it for cutting hay, tall weeds, trash, even rough lawn mowing. Cuts full 30" wide. Does not clog in heavy growth. Unbelievably low in price, easy and practical to use.

POWER WOOD SAWING

Cuts logs like butter—any kind of wood up to 14" in diameter. Will pay for itself over and over again if you have wood-lot. Low-cost, practical, easy, safe to operate.

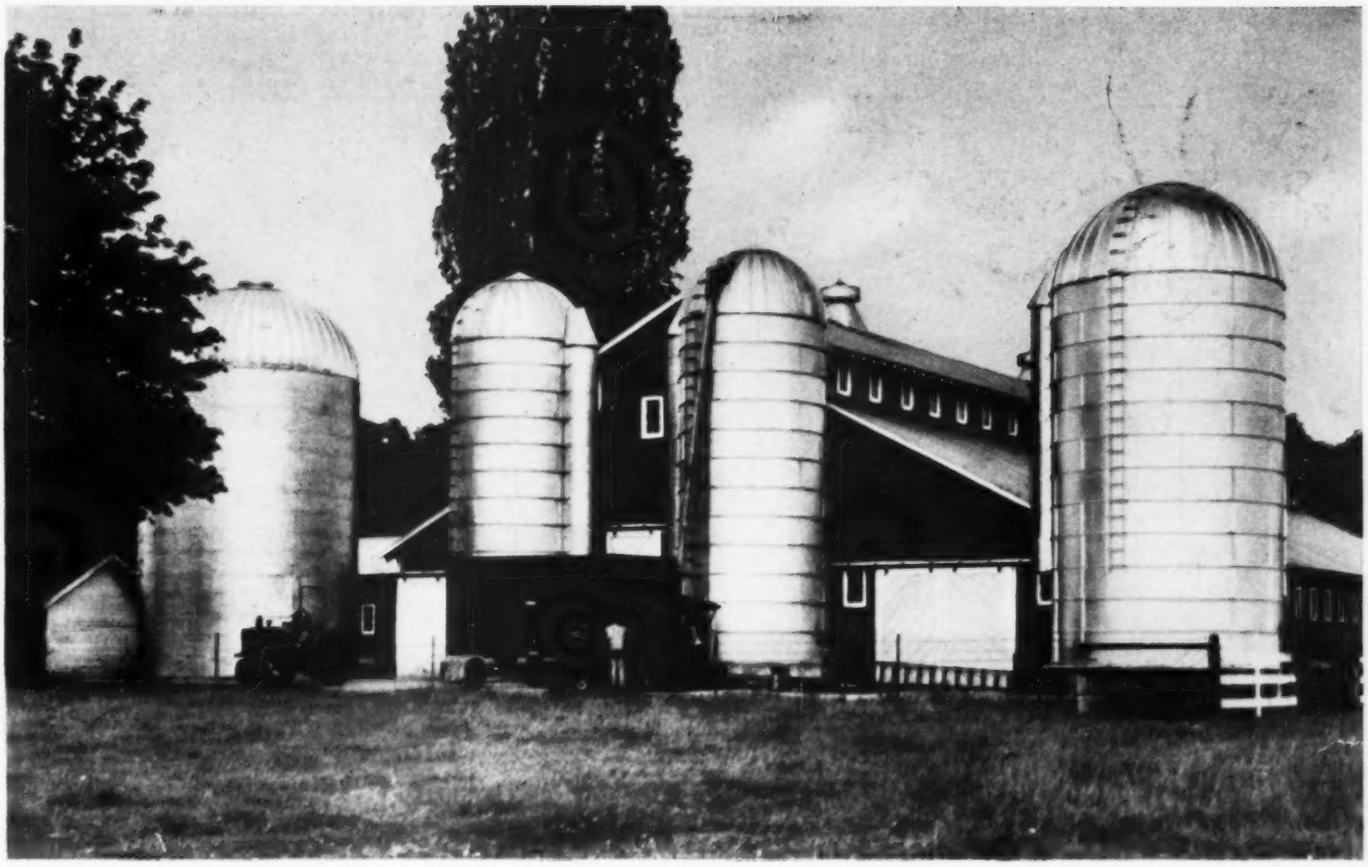


POWER PUMPING

Pump water from stream or pond to irrigate lawn and garden. Also for fire fighting, or to fill cisterns early or late in year when regular supply is shut off. **V-Belts are also readily available for POWER TAKEOFF for other uses of Roto-Ette.**

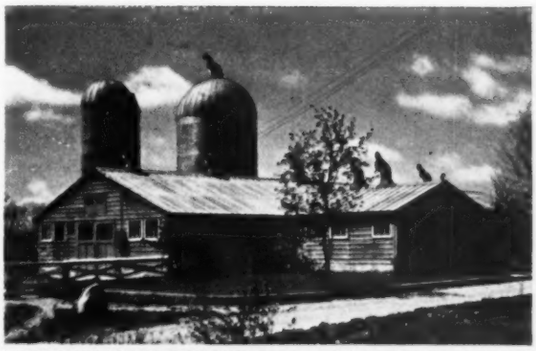
POWER SNOW PLOWING

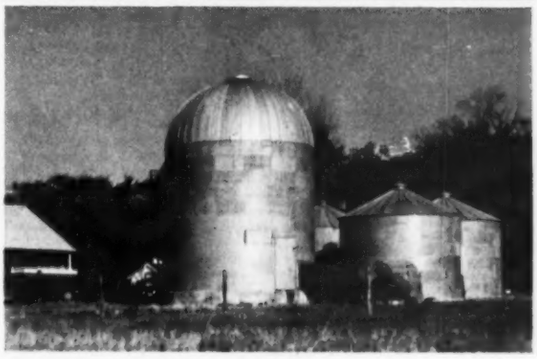
Ideal for walks, paths, average driveways. Plows 30" wide. Swivels to right or left! Quick, easy to put on, take off. Also good for grading, light bull-dozing.



You need MORE than modern farm machinery

TO OPERATE A MODERN FARM





No modern farm can be without labor-saving machinery. But it takes more than that. Modern farming also requires housing, storage and conditioning methods that make the most of that modern machinery, and of present-day scientific knowledge of soils, seed, stock, and feeds.

You need corn cribs and grain bins that double as conditioning systems . . . buildings that let you load, unload and shell out corn without hand labor . . . silos and Haymakers that conserve the *food value* in the crops you raise . . . corn storage and conditioning methods that let you pick corn when it is *ripe* . . . self-feeding Haymakers so cattle can feed themselves . . . weather-proof, rat-proof, fire-proof, labor-saving buildings scientifically designed for modern farm operations.

For nearly 50 years, Martin Methods have helped farmers make the most of their crops—have pioneered in ways to cut farm operating costs while increasing farm productivity. The coupon below will bring you details on how to make the most of *your* next crop. Mail it today!

FREE HELPFUL FOLDERS

. . . SEND COUPON TODAY!

STEEL MARTIN Farm Buildings -BILT

MARTIN STEEL PRODUCTS CORPORATION

503 Longview Ave., Mansfield, Ohio

Please send me FREE literature on Martin Methods for

☐ GRAIN & CORN CONDITIONING & STORAGE ☐ CHICK & POULTRY HOUSING
☐ GRASS FARMING ☐ DAIRY & BEEF CATTLE HOUSING ☐ IMPLEMENT STORAGE

Name_____

Address_____

City_____ State_____

You can be the Champion corn husker with an . . .

MINNEAPOLIS-MOLINE
MODERN MACHINERY

HUSKOR

LEADING THE PROGRESS PARADE IN MODERN HARVESTING MACHINERY . . . THE MM SELF-PROPELLED UNI-HARVESTOR CONVERTS TO A PICKER-HUSKOR. INCLUDES THE SUPERIOR FEATURES THAT HAVE MADE MM HUSKORS SUCH OUTSTANDING MACHINES . . . EASILY CONVERTS TO A UNI-COMBINE TO LOWER MACHINERY COSTS ON EVERY FARM.

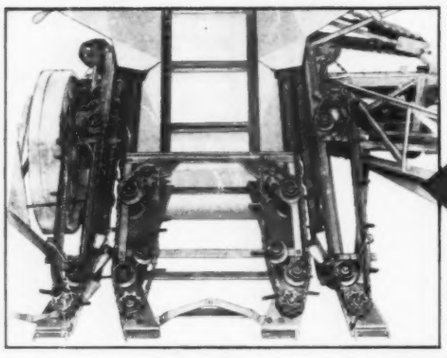
Pick, husk and clean up to 25 acres of corn a day with the MM 2-row, up to 13 acres with the MM 1-row HUSKOR. It used to take 12-18 hand huskers to do that! Now you can cut the work out of corn picking with these MM HUSKORS that are *built to get* ALL *your crop*. They're smooth-running, easy-pulling MODERN MACHINES that can save you *more* corn . . . husk *more acres per day* . . . and *cut your labor costs* with their outstanding capacity.

MM picker design gives you *whole clean* ears . . . *practically eliminates shelling in the field*. Five-position floating snouts guide even the strung-out down stalks into gathering chains; (6 on 2-row and 3 on 1-row machines). Chains guide ALL the stalks into *longer, specially designed* MM snapping rolls. Husked corn elevators on both MM HUSKORS are on the back.

FASTER, EASIER, SMOOTHER HUSKING

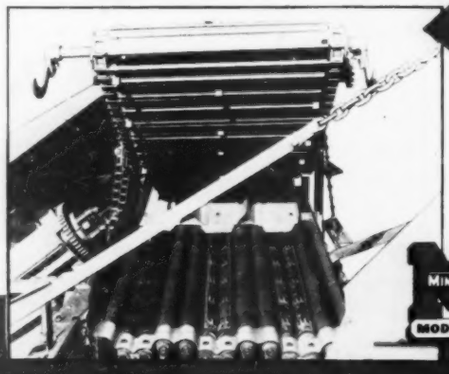
Spring-tension safety clutch gives MM HUSKORS automatic protection against breakage in case operator strikes an obstacle. Sealed roller and thrust bearings on all principal drives. Steel power take-off drive gears operate in continuous oil bath.

All controls are within easy reach. Without leaving the seat, you can change the trailing distance of your wagon to keep load evenly distributed. HUSKOR HITCHES fit wide or narrow tread tractors. MM UNI-MATIC POWER is available to give you finger-tip hydraulic control of picking height.



LONGER

Extra long 53¼-inch snapping rolls on the MM HUSKORS get the high ears and low ears. To prevent shelling in the field, only the lower 18-inches of the MM Snapping Rolls are grooved. Snapped ears fall automatically into elevator. Spring-operated stop prevents snapped corn from falling to the ground.



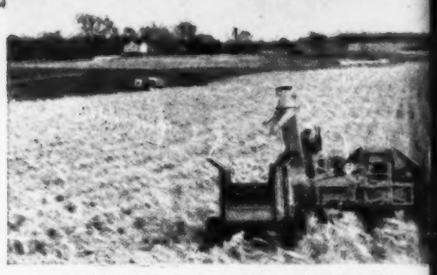
MORE

You get greater capacity and better cleaning with the MM HUSKORS. Full-length metal, and rubber-coated rolls husk faster, more efficiently under all husking conditions. (There are twelve rolls 36 inches long on the 2-row . . . 6 metal and 6 rubber—and eight rolls 27 inches long on the 1-row . . . 4 metal and 4 rubber.) Feeder apron above the husking bed is adjustable.

Invest in *your* farming future. SEE your MM Dealer now.

MINNEAPOLIS-MOLINE
MODERN MACHINERY

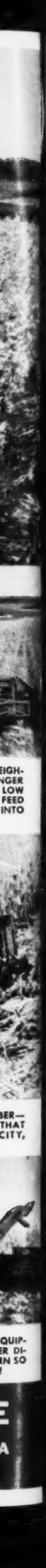
Quality Control IN MM FACTORIES ASSURES DEPENDABLE PERFORMANCE IN THE FIELD



FOR FIELD EFFICIENCY THAT WILL MAKE YOUR NEIGHBORS TALK, IT'S THE MM 2-ROW HUSKOR. LONGER SNAPPING ROLLS GET THE HIGH EARS AND THE LOW EARS, TOO. 5-POSITION FLOATING SNOUTS FEED EVEN THE DOWN AND OUT-OF-LINE STALKS INTO GATHERING CHAINS.

MORE HUSKING ROLLS OF METAL AND RUBBER—LONGER PICKING ROLLS—GET ALL THE CROP THAT CAN BE SAVED, PROVIDE GREATER CAPACITY, CLEANER HUSKING.

ORIGINAL MM CLEANING FAN IS REGULAR EQUIPMENT ON THE HUSKORS. ADJUSTABLE SHUTTER DIRECTS THE AIR BLAST RIGHT *THROUGH* THE CORN SO IT FALLS INTO YOUR WAGON—*CLEANER!*

MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA